

65/D

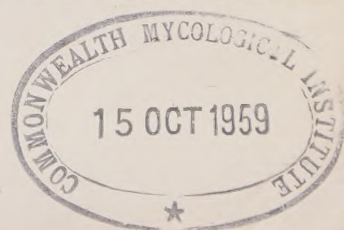
BRITISH WEST INDIES
CENTRAL SUGAR CANE BREEDING STATION
BARBADOS

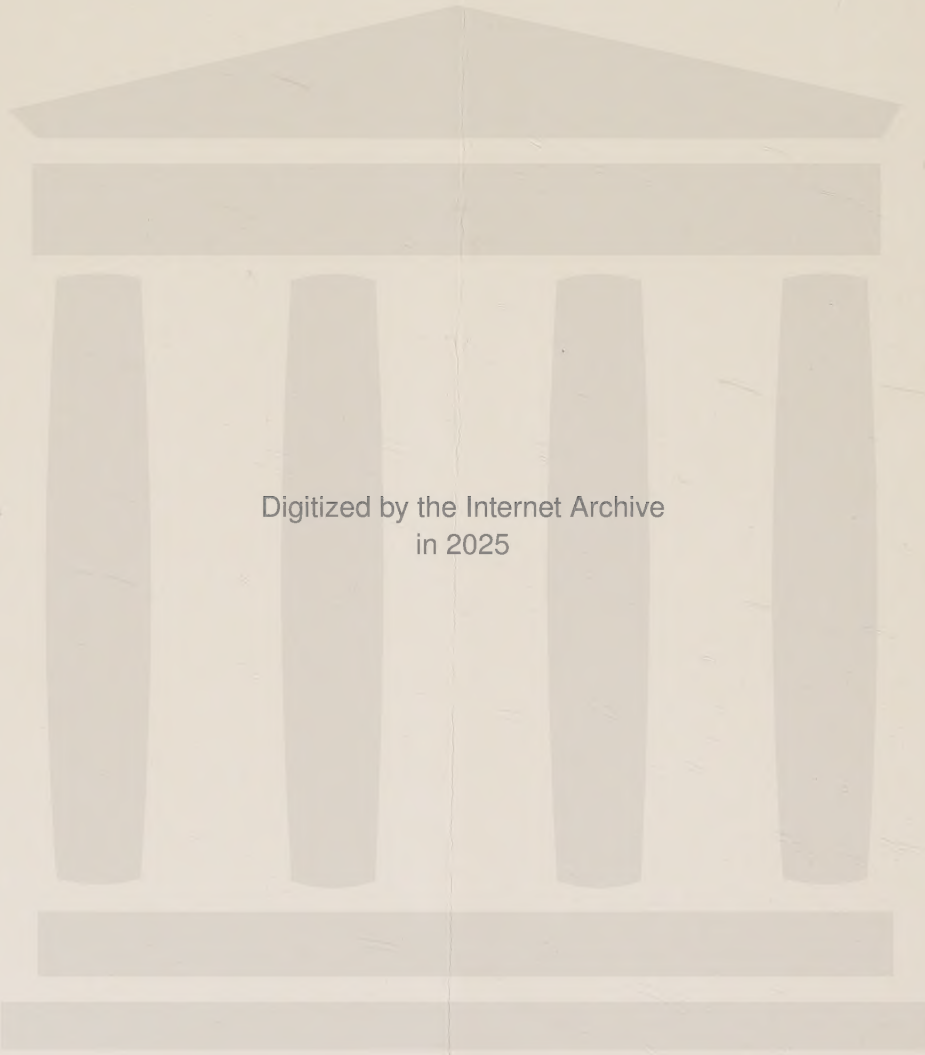


TWENTY-FIFTH
ANNUAL REPORT

1957—58

	NSP	
✓	RAM	
	MM	





Digitized by the Internet Archive
in 2025

TABLE OF CONTENTS

	<i>Page</i>
ADVISORY COMMITTEE & STAFF	3
FOREWORD	5
INTRODUCTION	7
SUGAR CANE BREEDING — SEEDLING RAISING AND PRELIMINARY ELIMINATIONS	10
RESEARCH WORK	19
VARIETAL TRENDS IN CONTRIBUTING TERRITORIES	26
DISTRIBUTION OF VARIETIES TO CONTRIBUTING AND OTHER COUNTRIES	29
APPENDIX I	30
APPENDIX II	36
APPENDIX III	39
APPENDIX IV	42
APPENDIX V	43

ADVISORY COMMITTEE

BARBADOS	...	...	...	...	MR. C. C. SKEETE, O.B.E., <i>Director of Agriculture, Chairman.</i>
BRITISH GUIANA	...	...	...	...	MR. A. F. MACKENZIE, O.B.E., <i>Director of Agriculture.</i>
IMPERIAL COLLEGE OF TROPICAL AGRICULTURE	...	...	...	...	DR. G. A. C. HERKLOTS, <i>Principal.</i>
JAMAICA	...	...	...	...	MR. R. F. INNES, <i>Director of Research, Sugar Manufacturers' Association (of Jamaica) Ltd.</i>
LEEWARD ISLANDS	...	...	...	...	MR. M. PARK, O.B.E., <i>Director of Agriculture.</i>
TRINIDAD	...	...	...	...	MR. F. M. BAIN, <i>Chief Technical Officer, Department of Agriculture.</i>
WINDWARD ISLANDS	...	...	...	...	MR. B. deCOTEAU, <i>Manager, Roseau Estate, St. Lucia.</i>

SIR JOHN SAINT, Kt., C.M.G., O.B.E. (*Honorary Member*)

STAFF

<i>Senior Geneticist:</i>	...	...	...	G. C. STEVENSON, B.A., A.I.C.T.A.
<i>Junior Geneticist:</i>	...	...	...	D. I. T. WALKER, M.Sc.
<i>Botanist:</i>	...	...	...	B. deL. INNISS, B.Sc., A.I.C.T.A.
<i>Field Officers:</i>	...	...	...	N. L. FOSTER C. D. GILKES. A. N. C. HEWITT
<i>Statistical Clerk:</i>	...	...	...	E. L. JONES.
<i>Secretary:</i>	...	...	...	MISS S. O. MAXWELL

Foreword

This issue of the Station's Annual Report is presented in a new form, which it is hoped will be found more attractive in layout and more readable than previous ones. While the information on breeding and testing programmes is not less than in former reports, only summarized results are presented in the main body of the text, and the mass of statistical tabulated data is relegated to a series of appendices which can be consulted by those particularly interested. A few photographs are included to show certain aspects of the Station's work.

The year 1957-58 was a satisfactory one. It was marked particularly by the success of experiments with the solution technique of sugar cane breeding and by a considerable expansion of the research programme made possible since the appointment of the Junior Geneticist.

Varieties bred at the Station continued to occupy virtually the entire cane areas of the British Caribbean sugar-growing territories and the majority of the areas in foreign contributing territories. They were grown also to a very considerable and increasing extent in some non-contributing countries such as Puerto Rico and Cuba.

Leaf scald disease of sugar cane, which was present previously in only British Guiana and Martinique of the Station's contributing area, was confirmed in St. Lucia during the year. This fact places even greater emphasis on the importance of the Station's breeding programme aimed at producing resistant varieties. It also emphasises the importance of effective quarantine where varieties are introduced from outside the Caribbean area, or where movements of cane material are made from one territory to another within the area. Such quarantine is obligatory in the case of British territories except in the case of material sent out for propagation from the station in Barbados, where there is no major disease of sugar cane.

C. C. SKEETE

Chairman of Advisory Committee.

British West Indies Central Sugar Cane Breeding Station Barbados.

TWENTY-FIFTH ANNUAL REPORT FOR THE YEAR ENDING THE 30TH SEPTEMBER, 1958

INTRODUCTION

The Station's year 1957—58 was a satisfactory one, both from the point of view of the breeding programme and also from that of the progress made in research investigations.

Conditions for sugar cane breeding were very good, and a full programme was carried out. The majority of the crosses were again made in the old Barbados-type breeding lanterns, but in view of the success of experiments with the solution method, which is more economical and convenient, it was decided that no further lanterns of the old type should be constructed. So long as the existing ones remain serviceable, though, they will continue to be used for part of the programme.

Results of experiments with the solution technique, modified in the light of experience in the previous year, were most gratifying. Excellent germinations were obtained from crosses carried out in 5-gallon pails, either enamelled or painted internally with anti-corrosive paint and with plastic pads to prevent damage to the paint by cut canes. The solution was made up in rainwater and contained about 150 p.p.m. sulphurous acid and 85 p.p.m. phosphoric acid. The crosses were set up in a disused quarry at the Codrington Nursery, which was reasonably free from major wind currents, and were well separated from one another. Bi-parental crosses and also area crosses (using several females with a common male) and top-crosses (using an inbred male) were used.

Recent work in Queensland has shown the extreme mobility of sugar cane pollen, even in almost still air. For this reason, to minimise the risk of contamination, and also for the sake of convenience of setting up and servicing crosses, it was decided to experiment with a new type of permanent lantern battery, devised by the Station's senior staff. Construction of a pilot battery was begun during the year. The battery contains ten lanterns, and being constructed of light metal framework on a concrete base, should be relatively inexpensive, permanent, and virtually indestructible. The solution will be held in enamelled metal troughs, fitted with drain plugs to avoid the necessity of removing the cut arrows at each change of solution.

Ripening arrows, after hybridisation by the solution technique, were fitted with special paper cones to collect fallen fuzz, and by this means it was possible to allow full ripening before harvesting without loss of the upper, more mature, fuzz.

Germinations were excellent, both from crosses made in the breeding plots at Groves, and from the solution crosses at Codrington. Fuzz consignments sent in polythene bags, with calcium chloride, by air mail to Jamaica and British Guiana are reported also to have given very good germination: nearly forty thousand seedlings were planted from this fuzz in Jamaica, and more than thirteen thousand in British Guiana. Barbados nursery plantings from the season's fuzz retained were well over a hundred thousand seedlings. This total is considerably more than that of any previous year, and is accounted for by a larger proportion of bunch plantings, which obviate the necessity of discarding seedlings at the box stage through lack of space in the field.

The weather in Barbados was marked by a severe drought from January until late May, which seriously reduced the island's sugar crop and retarded growth of the young canes. In the breeding plots at Groves, full use was made of the newly installed irrigation system, with the result that satisfactory growth was made, even by the late-planted plots, and the canes entered the critical period of arrow initiation in a sufficiently advanced state. Consequently, indications are that arrowing will be satisfactory, and that the wisdom of the expenditure on irrigation equipment has been demonstrated already.

New importations of breeding varieties during the year, through the Trinidad Quarantine Station, included an interesting *robustum* form, 51 NG.63, the Mauritius variety Ebene 1/37, the recent Coimbatore varieties Co.475, Co.678, Co.775, Co.991 and the Australian varieties Ragnar and Vesta. Other varieties obtained for the Station are still in quarantine in Trinidad, including several from the 1951 collecting expedition.

Final arrangements were made during the year for greatly increased participation in the work of the Station by our contributors in the Dominican Republic, La Romana Corporation. By these arrangements they will receive in future not only a much wider range of varieties for testing, but also supplies of crossed fuzz for the purpose of raising their own seedlings. It is a pleasure to record our appreciation of the cordial relations which have existed between the Station's officers and the research and administrative staff at La Romana since their original acceptance as contributors in 1948.

An application from Costa Rica to become a contributing member of the Station's organisation was considered by the Advisory Committee, and was accepted subject to their agreement to the rate of contribution decided upon.

The Senior Geneticist and the Junior Geneticist attended the 1957 meeting of B.W.I. Sugar Technologists in Antigua and St. Kitts.

The Junior Geneticist attended the Tenth International Congress of Genetics in Montreal in August 1958.

Visits to member territories during the year: the Senior Geneticist visited Jamaica for consultations with the staff of the Research Department of the Sugar Manufacturers' Association on variety problems and disease resistance testing. The Junior Geneticist visited British Guiana, Trinidad and Jamaica to study cane growing conditions and variety requirements.

The Senior Geneticist was appointed a member of the Technical Co-ordinating Committee for Agriculture and Allied Research in the West Indies, and attended a meeting of the Committee in Trinidad in April 1958.

In addition to the members of the Station's Advisory Committee, which met in Barbados in November 1957, visitors to the Station during the year included scientists and persons associated with the sugar industry from England, France, Queensland, Brazil, Mauritius, Reunion, Mexico, Puerto Rico, Trinidad and Grenada.

As in previous years, close co-operation was maintained with the Barbados Department of Agriculture, and the valuable assistance received from the Director of Agriculture and his staff is gratefully acknowledged.

Publications by the Station's staff during the year were:—

- (i) STEVENSON, G. C. — "The British West Indies Central Sugar Cane Breeding Station — Twenty-five Years' Progress". *Proc. B.W.I. Sugar Tech. Meeting, 1957*.
- (ii) STEVENSON, G. C. — "Some Thoughts on Variety Selection in Sugar Cane". *Int. Sugar Jour.* LIX, No. 707. November, 1957.
- (iii) STEVENSON, G. C. — "Heat Treatment Effects on Two Sugar Cane Varieties in Barbados". *Int. Sugar Jour.* LX, No. 717. September, 1958.
and
WALKER, D. I. T.

Sugar Cane Breeding—Seedlings Raising and Preliminary Eliminations

(a) Breeding:

The total rainfall at Groves was good but rains were late and were not well distributed. The actual rainfall was 74.09 inches. Some irrigation, making use of the Irrigation Board's test pump and generating set, was carried out at Groves until the middle of July. The opportunity was taken to clean and deepen the well in anticipation of permanent irrigation equipment being installed. Flowering was free and concentrated over a relatively short time.

Fairly extensive trials with the Hawaiian technique were carried out, making use of five and six-gallon drums coated with two coats of bitumenous paint with discs of heavy plastic placed in the bottoms to prevent the canes breaking the film of paint. These proved to be very successful and good germinations were obtained.

There was an increase in the use of imported parents, and more emphasis was placed on the use of recent successful B. varieties as parents, but the breeding programme followed the same general lines as those of the two previous years. A total of one hundred and sixty-five crosses, selfs and top-crosses were made at Groves, while sixty-nine crosses were made by the solution method at Codrington. These numbers constitute records for the Station. Extensive use was made of area crosses, *i.e.* crosses in which several females are pollinated by a single male. This method saves space, and enables a larger number of crosses to be made at once than would otherwise be the case.

(b) Seedling raising, potting and planting in the Field Nursery:

Germination was very good on the whole, though a few crosses proved to be incompatible and gave few or no seedlings. It is estimated that over one hundred and five thousand seedlings germinated, of which 22,216 singles and 14,947 bunches of approximately 5 seedlings each were planted in the First Year Seedling Nursery. Fuzz was sent to British Guiana and Jamaica from which 13,120 seedlings were germinated in British Guiana and 42,514 in Jamaica. This gives a grand total of 152,626 seedlings which were planted out from the B.60' Series, assuming a full survival of seedlings in the bunch plantings.

Table I gives under group heads a list of the numbers of crosses made, the numbers of seedlings germinated and the numbers planted in the First Year Seedling Nursery, while Appendix I gives detailed information for each cross made.

TABLE I.

SUMMARY OF BREEDING PROGRAMME 1957—58 FOR THE B.60' SERIES

GROUP	No. of Crosses	No. Germinated	No. PLANTED IN FIELD NURSERY	
			Singles	Bunches
<i>S. officinarum</i>	2	2,263	17	340
<i>S. officinarum</i> x <i>S. spontaneum</i>	21	8,193	2,121	1,127
<i>S. officinarum</i> x <i>S. barberi</i>	3	12	11	—
<i>S. officinarum</i> x <i>S. sinense</i>	2	10	7	—
<i>S. officinarum</i> x <i>S. spontaneum</i> x <i>S. barberi</i> ...	117	67,471	13,390	9,690
<i>S. officinarum</i> x <i>S. spontaneum</i> x <i>S. barberi</i> x <i>S. sinense</i>	24	16,654	2,101	2,826
<i>S. officinarum</i> x <i>S. spontaneum</i> x <i>S. sinense</i> ...	6	1,150	283	150
<i>S. officinarum</i> x <i>S. spontaneum</i> x <i>S. barberi</i> x <i>S. robustum</i>	11	5,596	1,967	628
<i>S. officinarum</i> x <i>S. spontaneum</i> x <i>S. robustum</i>	2	952	2	186
<i>S. officinarum</i> x <i>S. spontaneum</i> x <i>S. sinense</i> x <i>S. robustum</i>	1	73	68	—
Selfs in research programme	27	2,710	2,249	—
TOTALS	216	105,084	22,216	14,947

PLANTING THE FIRST YEAR SEEDLING TRIAL — B.59' SERIES:

The seedlings of this series were bred in 1956, potted and planted in the First Year Seedling Nursery in May 1957. This Nursery contained 20,630 singles and 6,785 bunches. In October 1957, the seedlings in the Nursery were examined and the obvious misfits were eliminated. This reduced the number to 4,962 seedlings which were planted in the First Year Seedling Trial along with the standard variety B.49119 every fifth stool. Table II gives, under group heads, the numbers of crosses, the numbers of seedlings in the First Year Nursery, and the numbers of seedlings in the First Year Seedling Trial. Detailed figures for each cross are given in Appendix II.

TABLE II

SUMMARY OF NURSERY SELECTION 1957 FOR THE B-59' SERIES

GROUP	No. of Crosses	NO. PLANTED IN FIELD NURSERY		No. Planted in First Year Seedling Trial
		Singles	Bunches	
<i>S. officinarum</i>	1	555	—	91
<i>S. officinarum</i> x <i>S. spontaneum</i>	5	1,611	274	188
<i>S. officinarum</i> x <i>S. spontaneum</i> x <i>S. barberi</i>	78	15,386	5,320	3,879
<i>S. officinarum</i> x <i>S. spontaneum</i> x <i>S. sinense</i>	1	229	651	104
<i>S. officinarum</i> x <i>S. spontaneum</i> x <i>S. barberi</i> x <i>S. sinense</i>	14	1,140	210	333
<i>S. officinarum</i> x <i>S. robustum</i>	2	516	203	107
<i>S. officinarum</i> x <i>S. spontaneum</i> x <i>S. robustum</i>	3	532	47	133
<i>S. officinarum</i> x <i>S. spontaneum</i> x <i>S. barberi</i> x <i>S. robustum</i>	5	527	—	109
<i>S. officinarum</i> x <i>S. barberi</i> x <i>S. robustum</i>	1	134	80	18
TOTALS	110	20,630	6,785	4,962

Assuming that five seedlings per bunch survived to the Nursery stage, this would mean that a total of 54,555 seedlings were planted in the Nursery. Of these only 4,962 reached the First Year Seedling Trial — an elimination percentage of 90.9. There are ample indications that in fact survival in bunches is of a much lower order in our conditions. At the time of selection, two seedlings per bunch would be a closer estimate, making a total of 34,200 at the time of selection. The elimination percentage then drops to the more realistic figure of 85.5.

REAPING THE FIRST YEAR SEEDLING TRIAL — B.58' SERIES:

The seedlings of this series were bred in the 1955—56 season, potted and planted in the Field Nursery in May 1956 and from this into the First Year Seedling Trial in October 1956.

As in previous years, the seedlings were cut in February, cleaned, bundled and laid out for inspection. Selection was made initially on appearance, which was based to some extent on the appearance of the neighbouring stools of the standard variety. After selection, the following data were taken:— (1) number of canes per stool; (2) number of rotten canes per stool; (3) percentage arrowing; (4) weight in lb.; and (5) Hand Refractometer Brix Readings. The latter figures were obtained by testing juice samples from the middle of each cane in the stool, thus removing any selection bias on the part of the scaleman. All canes from which data are taken are designated "field selections", but if the brix does not reach a certain standard the seedling is discarded in the field. Later the selected bundles are taken to the yard at Codrington where a further selection is made after consideration of the field data. Any varieties which come through this stage are known as "final selections" and are planted in multiplication plots with a view to their being put into Second Year Seedling Trials or breeding plots during the following planting season.

In this series two hundred and thirty-one selections were made, and were planted in multiplication plots at Codrington. In this particular trial the standard variety was B.49119, and this proved to be so vigorous, particularly in the early stages of growth, that it undoubtedly subdued many neighbouring seedlings of different growth habit. This is typical of border effects in small plots. Yields of the standard were therefore magnified and those of certain seedlings probably depressed. All stools of the standard were reaped, and the cane number and stool weight determined. A dispersed sample of the stools was used for brix reading as a guide for selection:

The data from the standards revealed that there were no obvious trends in yield across the trial field; one corner gave slightly lower brix values. Average values for B.49119 were as follows:—

CANES PER STOOL	...	...	...	24.4 ± 6.56
LB. PER STOOL	...	...	...	80.2 ± 25.9
BRIX	...	...	...	21.8

These served as a guide for the selection, but were not used too rigidly, particularly in yield characters which show more variability. The weights of seedlings selected in fact varied from 38 to 102 lb., the lowest accepted brix being 20.0

Details of the field and final selections for each cross are given in Appendix III.

PLANTING THE SECOND YEAR SEEDLING TRIALS — B.57' SERIES:

The one hundred and seventy-nine seedlings of this series were multiplied in ten-stool plots at Codrington Experiment Station. They were examined in October 1957 when a minor selection reduced this number to one hundred and twenty-one for planting in Second Year Seedling Trials. However, cuttings of all the varieties were sent to British Guiana and Jamaica for selection under their conditions.

In these trials the seedlings themselves are divided into groups of 18. Each group is replicated with 2 standard varieties in three randomised blocks. With the present organisation it is possible to carry as many as sixteen groups, testing a total of two hundred and eighty-eight seedlings in these trials. Each group is duplicated at a high and low rainfall station. There are thus six plots of each variety — three at a high and three at a low rainfall station.

REAPING THE SECOND YEAR SEEDLING TRIALS — B.56' SERIES:

The eighty-three varieties of the B.56' Series were cut in Second Year Seedling Trials at the low rainfall station, Codrington, and in a duplicate trial at the high rainfall station, Hothersal.

Five seedlings were selected from these trials, one of which was for the breeding plots only. The seedlings of the B.56' series were indeed a poor lot, and although four of them were selected as commercial possibilities, it is very improbable that any will prove to be useful under Barbados conditions. Accordingly, no Third Year Seedling Trials will be planted during the coming season, but the few selected seedlings will be held over and included with the selections of the B.57' series.

The performances of the selected seedlings relative to those of the standards are given in Table III. In these trials the brix recording was altered slightly by re-distributing the twelve juice punch samples taken from each plot. Two punches,

$\frac{1}{3}$ and $\frac{2}{3}$ from the base of six canes, were taken in place of bottom, middle and top punches from 4 canes. The mean difference between lower and upper readings is an indication of the maturity at the time of reaping.

TABLE III.

SECOND YEAR TRIAL — B.56' SERIES — PLANT CANES

Low Rainfall Station (L) ca. 55" CODRINGTON Reaped 18th-19th February, 1958

High Rainfall Station (H) ca. 80" HOTHERSAL Reaped 18th-20th March, 1958

VARIETY	PARENTAGE	NO. CANES PER STOOL (ROTTEN)		ARROWING		REFRACTO-METER BRIX		TONS CANE PER ACRE	
		L	H	L	H	L	H	L	H
B.41211	Standard	14.2(0.8)	—	2%	—	23.08	—	40.59	—
B.4744	Standard	—	15.3(2.5)	—	5%	—	22.99	—	57.17
B.49119	Standard	16.8(0.2)	21.4(1.8)	13%	38%	24.94	22.96	48.72	59.23
B.5610	B.3439 x B.45236	61(14)	102(26)	heavy	heavy	106	99	58	70
B.5660	B.45170 x B.4744	140(47)	125(54)	nil	light	108	106	115	77
B.5686	S.45 x B.41227	92(50)	85(75)	light	heavy	107	104	84	85
B.5695	B.4145 x B.4788	116(155)	91(118)	nil	light	100	99	91	93
B.56102	B.44111 x B.4098	126(77)	98(171)	light	mod:	111	104	134	101

Performances of standards are given as averages of all groups involved. Those of seedlings are expressed as a percentage of the standards B.41211(L) or B.4744(H) in their own group. Arrowing is not compared with the standards, but is grouped as nil; 1—10% light; 11—25% moderate and more than 25% heavy. The rainfall quoted is that received by the crop over the 15 month growing period.

SEEDLINGS OF THE B.55' SERIES — SECOND YEAR SEEDLING TRIALS
— FIRST RATOONS:

The seedlings of this series were cut as first ratoons in Second Year Seedling Trials at the low rainfall stations, Foursquare and Belle and in duplicate trials at the high rainfall stations, Hothersal and Pool. The selections B.5527, B.5557, B.55309, B.55362 and B.55369 failed to maintain their plant cane promise and may be discarded on their ratoon performance. Two seedlings B.55227 and B.55228 performed so well as ratoons that they were selected for trial in other contributing territories. Both of these varieties flower freely, particularly as plant canes, and would probably be unsuitable under Barbados conditions.

The performances of the selected seedlings relative to those of the standard varieties are given in Table IV.

TABLE IV.

SECOND YEAR TRIALS — B.55' SERIES — FIRST RATOON CROP

GROUPS I TO VI.

Low Rainfall Station (L) ca. 45" *FOURSQUARE*

Reaped 21st-26th March, 1958

High Rainfall Station (H) ca. 70" *HOTHERSAL*

Reaped 20th-22nd May, 1958

VARIETY	PARENTAGE	No. CANES PER STOOL (ROTTEN)		ARROWING		REFRACTO-METER BRIX		TONS CANE PER ACRE	
		L	H	L	H	L	H	L	H
B.37161	Standard	16.1(0.8)	13.0(1.9)	2%	15%	22.1	20.8	42.16	35.16
B.4744	Standard	—	15.5(2.1)	—	1%	—	20.4	—	46.21
B.49119	Standard	25.4(0.6)	—	0%	—	21.9	—	57.93	—
B.5503	B.3353 x B.40175	85(109)	115(56)	light	heavy	98	103	90	87
B.5527	B.3439 x B.45237	95(237)	149(27)	nil	heavy	103	99	75	54
B.5557	B.37161 x B.4098	64(196)	93(135)	mod:	heavy	103	100	76	72
B.5579	B.37172 x B.41211	75(182)	117(112)	nil	light	89	100	69	91
B.5599	B.39254 x B.47419	91(1,176)	133(73)	nil	mod:	87	91	85	106
B.55109	B.4145 x B.37193	56(3,522)	88(192)	nil	light	106	103	50	69
B.55111	B.4145 x B.39178	64(846)	71(193)	nil	mod:	105	103	65	76
B.55132	B.42304 x B.37193	58(196)	76(115)	nil	heavy	93	101	70	71
B.55137	B.4362 x B.34104	47(206)	96(110)	nil	light	91	110	46	88

GROUPS VII TO XII

Low Rainfall Station (L) ca. 55" *BELLE*

Reaped 27th-31st March, 1958

High Rainfall Station (H) ca. 70" *POOL*

Reaped 8th-12th May, 1958

VARIETY	PARENTAGE	No. CANES PER STOOL (ROTTEN)		ARROWING		REFRACTO-METER BRIX		TONS CANE PER ACRE	
		L	H	L	H	L	H	L	H
B.37161	Standard	14.4(0.6)	15.2(2.3)	1%	25%	21.3	20.5	41.39	35.11
B.4744	Standard	—	15.4(1.9)	—	2%	—	21.3	—	43.52
B.49119	Standard	23.9(0.5)	—	0%	—	21.8	—	61.94	—
B.55227	Co.421 x B.37193	92(51)	108(50)	nil	mod:	102	100	92	116
B.55228	Co.421 x B.37193	85(15)	105(72)	nil	mod:	102	100	83	109
B.55244	Co.421 x B.41211	63(178)	141(51)	nil	light	94	95	70	116
B.55250	Co.421 x B.41211	105(96)	204(27)	light	mod:	94	99	83	151
B.55258	Co.421 x B.46223	81(240)	198(43)	nil	light	97	100	107	210
B.55304	B.4145 x B.47419	66(418)	97(127)	nil	mod:	100	95	58	88
B.55309	B.42304 x B.37193	75(197)	66(422)	nil	light	101	99	58	48
B.55317	B.4362 x B.4098	45(405)	91(165)	nil	light	90	90	54	83
B.55362	B.3439 x B.3337	57(145)	66(239)	light	light	114	120	53	60

Performances of standards are given as the averages of all groups involved. Those of seedlings are expressed as a percentage of the standards B.49119(L) or B.4744(H) in their own groups. Arrowing is not closely compared with standards, but is grouped as follows: nil; 1-10% light; 11-25% moderate; over 25% heavy.

THIRD YEAR SEEDLING TRIALS:

These trials are intended to screen the selections of each series more extensively, so that any which come up to the performance of the standard varieties may be considered for final testing in Select Seedling Trials, and for commercial cultivation in Barbados. The layout of these trials takes the form of six randomised blocks with a plot size of twenty cane holes or approximately 1/87th of an acre. Sample bundles are taken from two of the six blocks for sucrose-in-juice determinations, milling at about 60% juice extraction. Other data obtained are:— (1) tons cane per acre; (2) refractometer brix readings, which are now taken from ten canes at points one-third down from the cut top, and one-third up from the butt; and (3) the number of rotten canes per plot.

There are six of these trials per series, situated at stations representative of the main ecological areas of the island, and the trials are cut as plants and first ratoons. Should any of the varieties prove to be outstanding, the trials are also cut as second ratoons.

(i) PLANT CANE TRIALS — B.54' SERIES:

Table V gives the performances of the varieties of this series which are worthy of mention as plant canes. Full data will be presented when the trials are concluded.

The 1958 reaping season was unusually difficult. After heavy October and November rainfall, December was dry and the crop season was drier than usual. There was a delay of some weeks in harvesting due to a strike in the industry. Because of these factors, brixes tended to be high, perhaps by desiccation, and purities low. Dry and rotten canes were more plentiful, particularly towards the end of the season. Certain varieties, including the commercial variety B.41211, suffered more than others. These facts have to be taken into account in interpreting trial performance.

Interesting varieties at this stage of the B.54' series trials include:—

B.5480 (B.37172 x B.4098) — outstanding in yield and juice quality. Canes medium to thick, long and recumbent, free trashing, very few late shoots. No arrowing observed in the trials, and the tops remain green well into the dry season.

B.54172 (B.47386 x B.4098) — reasonable yields where arrowing is not a limiting factor, *i.e.* in low rainfall areas nearer sea level. Excellent juice quality.

B.54142 (B.44341 x B.3337) — a clean, heavy recumbent type of cane, with very good quality but rather hard; promising for heavy soils and wetter areas.

B.5401 (B.3439 x B.3337) — another good quality cane, of upright growth, but free-flowering limited its yield.

B.53164 gave more variable yields, but is a clean, thick cane.

B.54163 has excellent juice quality but arrows freely.

B.5490 gave a good yield only in heavy soils where arrowing did not limit its performance.

B.54193 gave good yields but gave juices of inferior quality.

TABLE V.

THIRD YEAR SEEDLING TRIALS — B.54' SERIES

Reaped as Plant Canes in 1958.

<i>Plantation ...</i>	Spencers	Staple Grove	Pickerings	Buttals	Orange Hill	Todds
<i>Soil Type (Turner)</i>	IIa	IIb	IIb	IVb	IIc	IIc
<i>Reaping Date ...</i>	3-4 Feb:	6-7 Feb.	26-27 Feb.	12-13 Mar.	15-16 Apr.	14-17 Mar.

TONS CANE PER ACRE

B.41211 Standard	25.99	40.82	42.08	—	—	—
B.4744 Standard	—	—	—	53.14	49.40	46.14
B.49119 Standard	31.27	40.26	42.39	40.94	38.77	46.56
B.53164	24.57	37.86	41.08	46.97	35.13	44.12
B.5401	26.03	35.02	36.63	37.25	32.68	35.09
B.5480	26.47	47.60	43.56	48.91	48.89	49.37
B.54142	22.93	45.45	50.13	45.98	48.28	39.74
B.54163	24.58	29.41	37.03	36.68	32.21	33.04
B.54172	30.15	44.56	48.31	41.76	42.15	45.46

PERCENT SUCROSE IN JUICE (PURITY)

B.41211 Standard	16.8(82.6)	16.7(85.4)	17.5(86.4)	—	—	—
B.4744 Standard	—	—	—	19.8(89.4)	17.9(80.3)	17.1(84.7)
B.49119 Standard	17.1(84.2)	18.9(88.8)	18.8(88.8)	20.1(89.6)	17.1(79.3)	17.5(83.8)
B.53164	17.5(84.6)	18.7(87.3)	19.9(89.5)	20.8(89.9)	19.5(86.8)	18.1(86.2)
B.5401	18.0(85.6)	19.7(90.2)	19.5(89.4)	20.5(90.8)	19.3(86.6)	19.6(88.1)
B.5480	19.0(91.2)	18.5(90.5)	19.8(92.1)	20.0(90.0)	19.8(88.7)	18.9(89.3)
B.54142	18.3(87.8)	19.3(89.1)	19.3(91.8)	21.5(91.4)	19.9(87.9)	18.4(88.2)
B.54163	18.6(87.0)	19.0(89.8)	19.8(92.2)	20.2(89.4)	18.1(79.1)	19.5(86.7)
B.54172	17.7(87.5)	18.5(90.5)	20.3(93.0)	21.1(91.9)	19.1(86.2)	18.5(89.6)

NUMBER OF ROTTEN CANES

B.41211 Standard	5	4	43*	—	—	—
B.4744 Standard	—	—	—	26	48	48
B.49119 Standard	2	4	64*	44	55	23
B.53164	3	—	6	16	29	13
B.5401	3	2	9	45	66	46
B.5480	3	1	7	30	46	48
B.54142	7	6	10	14	35	22
B.54163	4	3	8	25	43	33
B.54172	1	2	3	23	52	22

* Rat Eaten

(ii) B.53' SERIES:

The results of two years' reaping are summarised in Appendix IV. The performances of varieties of this series fell rather below those of the standards, and are therefore of no further interest for testing. B.53200 (Co. 421 x B.41211), the best of them, was only outstanding on heavy soils in the St. George's Valley. It is a thin, trashy cane in ratoons and not of true commercial type.

(iii) B.52' SERIES

These were reaped as second ratoons in 1958, and bringing the trials to a conclusion. Average results for three crops are summarised in Appendix V. A number of this series was of commercial quality. Indeed, it is interesting to see that all these seedlings are clearly ahead of B.37161 in yield of cane per acre, and most in yield of sugar. Further, B.41211, as a standard variety in both the B.52' and B.53' series trials, shows itself to have very poor juice quality, even though averaged over three seasons and a range of reaping dates (October—November 1957)

Three of the B.52' series canes already planted in select seedling trials are:—

B.5213 (B.37161 x B.4098) — outstanding yields of cane in the low rainfall areas, especially in ratoons; juice quality not very satisfactory; a thick, self-trashing cane.

B.52107 (B.4145 x B.41227) — a very thick, clean cane, with rather few canes per stool, but promising yields and quality, particularly in the heavier soils and higher rainfall areas.

B.52298 (Co. 421 x B.41211) — a clean cane, slightly harder than B.41211, which yielded well in higher rainfall area trials and in certain intermediate areas.

Other canes giving good tons-sugar-per-acre, all had certain drawbacks — **B.5126** had exceptional quality, but is too thin and trashy to be considered commercially.

B.52144 is a thinner cane not easy to reap or clean, and with a tendency to rot later in the season.

B.52214 has long canes of procumbent habit from an early stage, making it very difficult to harvest.

B.52306 has heavy yields of cane but the juice quality is inferior.

B.52321 has very good quality with average yields of cane, but it is shy to germinate under our normal system, a defect too serious to allow recommending it commercially.

SELECT SEEDLING TRIALS:

B.49119 is being tested against all our standard varieties in a set of 6 latin square trials. Plot sizes are about 1/40 acre, and guard rows between plots increase the precision. The first ratoon crop was reaped in 1958.

In the low rainfall areas, B.41211 gave the heaviest yield of ratoon cane, but was outyielded by B.41227, B.4744 and B.49119 on sugar. Much the same remarks apply to the intermediate rainfall areas, except, that B.41227 was not included in the trials. In the trial on heavy valley soils, B.4744 gave the heaviest cane yield, but was not significantly higher in yield of sugar than B.41227, B.45151 and B.49119. In the high rainfall areas one trial was cut at the normal time, and rotten canes were not excessive. Here, B.4744 gave the heaviest yield of cane, but was outyielded by B.41227, B.45151 and B.49119 on sugar. At Cottage, the trial was not cut until the end of May, and only B.41227 and B.49119 withstood the adverse conditions, with rotting very serious in other varieties. B.49119 was heaviest in both cane and sugar per acre.

Two conclusions emerge so far. Firstly, the promise of B.49119 was exaggerated somewhat in the yields from smaller plots of earlier trials, as expected of a cane with such vigorous early growth, but it remains a good variety, particularly for the drier areas of the island. Secondly, its juice quality and resistance to rotting make it a valuable alternative to B.41211 for later reaping. In the higher parts of the island, in spite of arrowing being heavy, its long-standing high-fibre qualities may be of use to some estates.

The trials will be reaped as second ratoons in 1959 and complete data presented in the next report.

Research Work

I. The Inbreeding Programme:

There are three distinct aspects of the inbreeding approach which are being investigated:—

- (i) crosses between related parents;
- (ii) top-crosses, using selfs as male parents with proven female varieties; and
- (iii) the development of selfed lines, homozygous for certain characters.

Crosses between related parents have been established as a profitable breeding scheme for many years, and have already resulted in the development of commercial varieties, such as B.49119. They are of particular promise in breeding for disease resistance: figures from tests in Jamaica show that resistance percentages in seedling populations from parents both having the "blood" of P.O.J.2878 are higher than those for the general outcrossed populations.

Top-crosses have been made with male parents selfed for a few generations, with the object of obtaining segregation rather than a fixed homozygous line. Several crosses of this type were made in the 1957 crossing season, using second-, third-, and fourth generation selfs from B.4098, B.34104, B.3337, and B.35276, crossed onto such proven female parents as B.37161, B.37172, B.35207 and Co.421. Several thousand seedlings were obtained, and nursery plantings have been made which will be subjected to selection in no way different from populations in the general programme. Top-crosses of this type were made first in 1955, and seedlings from that year's populations have passed through the nursery and first year trials. They will be reaped as Second Year Seedlings in the crop of 1960. Seedlings which have so far reached the Second Year Trial are from Co.421 x a second-generation self of B.41211, Otaheite (Bourbon) x a similar second-generation self from B.41211 and B.37161 x third-generation selfs from B.3337 and B.4098 respectively.

The development of selfed lines homozygous for particular characters is being attempted by successive selfing over several generations. Many selfings were made in 1957 in this programme, some of which represent fifth and sixth generation selfs. In addition, new selfed lines were begun from the foundation parents B.37193, B.49119, Co.290 and Badila. Self-sterility was encountered in a few cases, and in some others germination was low, but from the majority of crosses satisfactory numbers of seedlings were obtained.

In order to evaluate seedlings in some of the lines, and to explore in a preliminary way the combining ability between members of different lines, a number of inter-line crosses has been made each year since 1955. Seedlings selected from the first batch of such crosses have been treated in the same way as those from the general programme, and several have been considered worthy of inclusion in the Second Year Trial for 1960, notably some from a cross between inbred lines from B.37161 and B.41211.

The results of inbreeding work to date in Barbados have been reported in some detail in a paper to be presented at the Tenth Congress of the International Society of Sugar Cane Technologists in 1959. It is well known that opinion among sugar cane breeders is divided on the value of the inbreeding method, though objections to it have been largely on theoretical grounds, as so far as is known there has been no experience elsewhere of selfing beyond the second generation, and extremely little

beyond the first. In Barbados several selfings in the fifth generation are now being made. The results obtained to date have shown that it would be unwise to forecast behaviour in selfing aneuploid interspecific hybrids, with duplicated genomes, from theoretical considerations based on the results of work with simple diploids. Some findings which refute arguments against the method advanced by some breeders are briefly mentioned below:—

- (1) It is untrue that selfing results always in loss of vigour of the seedlings. Particularly in the early generations of selfing, some populations show general vigour equal to or better than outcrosses. Several first, second and third-generation selfs have been sufficiently promising for inclusion in routine trials to develop commercial varieties.
- (2) The argument that loss of vigour would result in failure to arrow, thereby bringing further line development to an end, is not borne out by our results. In the late stages of some lines where vigour is materially reduced, most members arrow satisfactorily, some very heavily. On the other hand in some of the most vigorous individuals arrowing is either absent or very sparse. The conclusion is that arrowing in sugar cane varieties is not related to vigour, but, like yield or sugar content of juice, is controlled genetically, probably by a complicated polygene system.
- (3) Self-sterility and male-sterility have not proved to be the obstacles envisaged by some opponents of the inbreeding method. Fertility has been rather variable between the inbreds, even within lines from the same foundation parent, but true self-sterility has been rare. Male-sterility, which occurs in some 50% of outcrossed varieties in the breeding plots, is remarkably rare in selfs, particularly after the first generation. Even where it has occurred in some desirable individuals from first-generation selfing, it has not presented an unsurmountable obstacle, for sib-crossing or back-crossing has been resorted to without serious loss of the required effect in line development. The rarity of male-sterility in later selfed generations would indicate that male fertility is a feature which is fixed early in the inbred lines.
- (4) The possibility of post-meiotic parthenogenesis, suggested by geneticists in India, would not be viewed with alarm even if it were considered sufficient evidence had been established for its occurrence. It would be dependent upon a genetic system different in no material way from selfing, and might, moreover, result in homozygosis at a single step.

Vegetative characters have become fixed to a large degree in several of the lines, which are recognizable in respect of growth type, colour and shape of canes, and pigmentation of leaf sheaths. Moreover, they are predictable in the absence of appreciable segregation for these characters in successive generations of selfing. In other lines, however, segregation is considerable even after four generations of selfing, and it is suggested that an approach to homozygosity is reached more rapidly in some lines than in others. This feature is related to chromosome behaviour on selfing, which is considered below.

Particular attention was again paid to juice quality in the inbred lines. Brix readings were taken during March (at the height of the crop season in Barbados) for all individuals in the breeding plots. These and previous records were used as a basis of selection for further selfing to develop the inbred lines characterised by good juice quality. In general, the previous findings on maintenance of high juice quality in the different lines were corroborated. All lines from two of the original foundation

parents (B.4454, a *robustum* derivative, and B.41242, a *spontaneum* derivative through Kassoer) have been discarded on account of low juice quality in all individuals.

There is not yet sufficient evidence on which to base a comparison of the merits of the inbreeding and outbreeding methods, since inbred parents derived from selfing have so far been used only on a very small scale, and seedling progenies from them have not yet passed the Second Year Trial stage. However, it is of interest to record that of 428 seedlings from inbred parents reaped in the 1958 First Year Seedling Trial, two selections weighed over 90 lb. per stool. Of the remaining 5,753 seedlings in the trial, only four selections reached this standard of weight. As the brix means of seedlings from the inbred parents were also as good as those in the other populations, generally speaking, it is considered that the use of such inbred parents in top crosses is worthy of continuance, and indeed of cautious expansion, in future breeding programmes.

II. Laboratory Work:

As in previous years of late, laboratory work was concerned mainly with cytology, with particular reference to the inbreeding programme and to the fertility status of our parent varieties. Work was somewhat curtailed due to the absence of the Senior Geneticist on vacation leave during the summer months.

An investigation was made to ascertain the cause of male-sterility in B.37161, one of the standard "female" parents. Pollen mother-cell smears showed that meiosis is very regular for a hybrid of this nature, with 50—54 bivalents and 0—8 univalents. There is usually a single chiasma. Tetrad formation is apparently normal, and it was concluded that sterility is due to breakdown in the maturing pollen grains.

Some progress was made in evolving a convenient and satisfactory root-tip squash technique in sugar cane, which cytologists are agreed is difficult material from the point of view of hydrolysis and critical staining. Methods of accumulating mitoses in the tissues were also investigated.

Chromosome counts were made for a number of members in the inbred lines. The data helped to clarify the picture of chromosome behaviour on successive selfing which is emerging as a result of these investigations. Chromosome losses on selfing appear to be the rule rather than the exception in lines from interspecific aneuploid foundation varieties, but in the present state of our knowledge it is impossible to state which chromosomes are lost, or indeed whether there is any regular pattern in the process. Indications are that stabilisation will take place at chromosome complements well above the 80 of the noble canes, but how many of the additional chromosomes are from the "wild" progenitors is a matter for speculation at present. It is probable that different lines will vary in this respect. In some, such as the J series from B.4362 (which have been described in previous reports) and a few lines from B.41211, there is a definite "spontanisation" as a result of successive selfings. Recent reports from Queensland describe a similar reversion to *robustum* features in selfing interspecific derivatives from this species. In other lines, notably from B.37161 and B.34104, our work shows that thickness of canes and other 'noble' features are well retained after several generations of selfing.

A characteristic example of chromosome losses over four selfed generations is given by the following counts for a series from B.3337:—

B.3337 — 118, E.2 — 116, E.24 — 110, E.241 — 108,
E.2412 — 106.

An exception to the general pattern of chromosome loss on selfing is found in lines from B.37161 derived from an original sib-cross with B.37193. Both these varieties have 108 chromosomes, and four counts made for individuals from second-generation selfings of an original sib-seedling showed no loss of chromosomes whatsoever. It may or may not be more than a coincidence that members in this line are among the most vigorous of the inbred seedlings.

The successful use of cut arrows in breeding made possible the beginning of a series of experiments to work out a method of emasculation of sugar cane flowers by means of a hot-water technique. Though it would not be impossible to devise a modification of the technique successfully employed for sorghum, and apply it to cane arrows on their own roots, the convenience of handling cut arrows for hot-water treatment is evident. Hand emasculation is slow and laborious, and is out of the question when large numbers of seedlings are required from emasculated arrows, as in the case of the more refined biometrical methods of parent evaluation, which call for reciprocal crosses as well as selfs. The preliminary experiments were encouraging. Using the highly male-fertile B.3337 and B.4098, successful emasculation was effected, but further experiments are required before a suitable time-temperature relationship can be worked out to ensure adequate preservation of female-fertility following the treatment.

III. Seedling Raising Technique:

Particular attention was paid during the year to improvements in seedling raising technique. Losses of seedlings between potting and planting in the field nursery have been high for a number of years. The survival figures vary somewhat with the parentage, but average figures are shown in Table VI. A bunch is considered to have survived if only one seedling of the five potted remains at the time of planting into the field. Virtually, no selection of seedlings is made at this age, and it is considered that the losses represented purely poor horticultural technique.

TABLE VI
PERCENTAGE SURVIVAL BETWEEN POTTING AND PLANTING-IN-NURSERY STAGES IN RECENT YEARS

1953	...	...	singles	...	66%	no bunches planted
1954	...	...	singles	...	59%	bunches ... 78%
1955	...	...	singles	...	74%	bunches ... 96%
1956	...	...	singles	...	81%	bunches ... 78%
1957	...	...	singles	...	65%	bunches ... 91%
5-year average	...	...	singles	...	66.7%	bunches ... 84.8%
1958	...	...	singles	...	88%	bunches ... 94%

It can be seen that improved technique has already resulted in a markedly higher survival. The alteration made so far, on the basis of comprehensive trials, involve—

- (i) delay of the date of soil steam sterilisation to 4—8 weeks before use;
- (ii) storage of this soil in a moist condition after sterilisation;
- (iii) admixture of filter-press mud in the potting medium to prevent chlorosis. Artificial irrigation with alkaline ground-water formerly caused extensive chlorosis and death in many potted seedlings families; and
- (iv) treatment of the occasional families showing chronic chlorosis with repeated applications of a chelated iron compound.

Other factors awaiting study are:—

- (i) density of sowing;
- (ii) application of filter-press mud to sowing composts; and
- (iii) technique of watering newly potted seedlings.

IV. Seedling Characters:

Variations in vigour among potted seedlings 8—12 weeks old are often marked, and one is tempted to practise selection at this stage. There are indications, however, that seedling characters are not highly correlated with subsequent field performance. Shoot numbers were counted in some 4,000 seedlings of 36 families in May 1957 (B.59' series), at the time of planting out, and note taken which of these were selected — some 15% — in the field nursery at 8 months of age, for planting in the First Year Trial. At planting out the average shoot number of subsequent selections was sometimes greater, sometimes less, than the mean of the eliminated group, and certainly not significantly different. Furthermore, many of the selections had contained only one leading shoot at 8—12 weeks. These facts indicate that pot selection would be inadvisable, unless it is found that the correlation is far better at the First Year Trial selection stage. Cane numbers will be recorded for all the numbered seedlings in the 1959 First Year Trial, to find whether there is a better correlation.

V. Survival of Bunch-planted Seedlings:

If selection in young seedlings is in fact inaccurate, it is preferable for every seedling to have the opportunity to be selected or eliminated in a reasonably mature stage. Experiences in Hawaii and Australia suggest that bunches at 8 months of age frequently contain all the seedlings that were originally potted, if only as single canes. Bunch-planted stools in the Barbados nursery, on the other hand, often show only 1 or 2 varieties remaining from the five potted. Elimination is generally high, only a few families having some stools with 4 or 5 varieties. The difference between our bunches and those in Australia and Hawaii is probably largely "horticultural" and not the result of genuine competition among the seedlings in the bunch.

Seedlings in bunches tend to be subjected to less careful handling, and much of the mortality must take place before planting in the field. Comparing bunches and singles as in Table VI, it is found that in many families whole bunches die after potting almost as frequently as singles. Given equal horticultural conditions at this stage, the expectation is very much lower, since a bunch is termed alive if only one of the seedlings survives at planting-out time. If the singles show, say, 66% survival in pots, the expectation that a bunch of 5 seedlings would be entirely dead is only 0.41%. Our observed figures show that in nearly all families bunches die out more frequently than expected.

With present techniques, bunches seem to be unsatisfactory *as a general alternative* to singles, but a useful accessory when germinations are heavy and if survival is high in the early stages.

The performances of the selections from singles and bunches are being more carefully compared in families where both types are planted, to discover whether real advantages derived from competition in the bunches are present in our conditions. A method of comparing the two, using selection percentages but allowing for "horticultural" survival differences, is being devised.

VI. Analysis of Selection Percentages over 20 Years:

The bulk of the accumulated records of the Station refer exclusively to selected samples of seedlings, and are not therefore an unbiased guide to the genetic differences and overall family performances. The percentage selection figure is, however, presumably some reflection of the population performance, and can be a basis for expanding or discontinuing a cross or breeding line. Differences between families for this character will reflect true genetic differences, the main shortcoming being that it is a highly compound character, probably with rather low heritability. Its compound nature is an advantage, however, inasmuch as it represents in one figure the overall commercial worth of a family without recourse to measurement.

The two levels of variety testing examined in this way are:—

- (i) elimination at the nursery stage in six-month old seedlings (*i.e.* number planted in first year trial/number planted in nursery); and
- (ii) elimination at the nursery, first year trial (15 months old, single stools) and propagation plots (8 months old, ten stools) stages (*i.e.* number planted in second year trial/number planted in nursery).

So far each family since the B.37' series — the first series involving elimination at a nursery stage — has been recorded in this way, and general trends examined. The figures should, with full analysis, prove valuable in re-examining the value of proven crosses (running into several thousands of seedlings), in comparing basic breeding lines in their various combinations, in comparing single parents over a range of partners, in comparing seedling selection methods and requirements in contributing territories, and in the comparison of bunch-planted with single-planted seedlings.

VII. Heat Treatment Effects:

In 1953 Mr. D. R. L. Steindl, Pathologist in the Australian Bureau of Sugar Experiment Stations, visited the West Indies in connection with the scare that ratoon stunting disease might be present in the area. There were suspicions on the available evidence that the disease was present in Barbados, and accordingly the obvious step was taken — hot-water treatment for 2 hours at 50°C. and the establishment of nurseries of these “cleaned” stocks for distribution.

A number of estates planted these, and subsequently claimed that flowering appeared greatly increased. This seemed a highly interesting observation, particularly in view of the fact that the increased arrowing is a fixed character, obvious in material propagated twice since heat treatment. Several observational trials were carried out, and one latin square experiment. This latter was on Edgumbe estate, where flowering is normally very sparse, and the treated and untreated stocks growing on this estate were used for planting material. The trial was reaped in 1958; the results are given in Table VII.

TABLE VII.
HEAT TREATMENT TRIAL — EDGEUMBE PLANTATION — DATA FROM PLANT
CANES REAPED 19/2/58

	B.37161		B.41211		TREATED	UN- TREATED
	Treated	Untreated	Treated	Untreated	Mean	Mean
Tons cane per acre ...	41.25	44.78	43.87	49.48	42.56	47.13
Lb. per cane ...	4.42	4.70	4.25	4.16	4.33	4.43
Cane number per plot	490	495	535	639	513	567
Arrowing % ...	56	4	20	4	38	4
Sucrose-in-juice %	17.2	17.4	13.8	15.2	15.5	16.3
Apparent purity	88.3	88.0	74.1	77.0	81.2	82.5

The increase in arrowing is of course, highly significant. Since the arrowed canes stopped growing 4 months before reaping, it is to be expected that yields would be reduced with heat treatment. This was in fact found, the reduction being significant at $P = 0.02$. Other factors may also be contributing to this yield difference.

With these results as a preliminary indication, all commercial canes will be more thoroughly tested for their responses to heat treatment in a series of trials to be reaped in 1960—62. Meanwhile, heat treatment as a routine measure has been discontinued. Our interpretation of the effects awaits some further studies now planned, in the form of growth studies, infection tests and progeny tests.

This work was reported in a preliminary paper in the International Sugar Journal **60**, 251—253 (1958).

100
N 5

Varietal Trends in Contributing Territories

Jamaica:

B.41227 and B.4362 still dominated the variety acreage for the 1958 crop. The only other major variety, B.42231, is cultivated largely on the irrigated estates. The acreage under B.3439, B.34104 and B.37161 has decreased further, while B.37172, confined almost entirely to the wet eastern estates, has shown only a slight falling-off in popularity. Of the minor varieties, Co.331 has found some favour on the North Coast estates, and B.49119 shows promise in many areas in spite of some susceptibility to mosaic.

Variety per cent acreage figures for the crops of 1957 and 1958 were:—

					1957	1958
B.41227	...	...	...	...	29	34
B.4362	...	...	...	...	21	25
B.42231	...	...	...	...	11	11
B.37172	...	...	...	...	7	6
B.37161	...	...	...	...	6	4
B.3439	...	...	...	...	6	4
B.34104	...	...	...	...	6	4

Trinidad:

With a steadily maintained increase in acreage in the last three years, B.41227 has now become a major variety of the island, whose crop depends almost exclusively on four varieties.

The following table shows the percent acreages for the leading varieties in the 1957 and 1958 crops, but it is worthy of note that virtually all the B.41227 acreage is on one group of estates, while a very large proportion of the area devoted to B.37161 and B.37172 is located on another group:—

					1957	1958
B.3337	...	...	...	...	29.4	26.8
B.37172	...	...	...	...	25.9	24.5
B.37161	...	...	...	...	23.7	23.8
B.41227	...	...	...	...	11.3	17.4

British Guiana:

There was little change in the variety picture between 1957 and 1958, reliance being placed predominantly on B.37161 and B.41227. B.47258 has shown a further increase in popularity, largely at the expense of B.4098. The figures are as follows:—

					1957	1958
B.37161	...	...	...	...	43.0	42.9
B.41227	...	...	...	...	32.1	33.6
B.47258	...	...	...	...	2.8	5.8
B.47225	...	...	...	...	5.0	4.6
B.4098	...	...	...	...	5.3	3.1
Pindar	...	...	...	...	2.3	2.6

Antigua:

Here a major varietal change is in progress, largely due to the excellent results obtained with B.49119 in recent plantings. This variety has proved so successful and promising, both on the estates and with peasant farmers, that it is encroaching rapidly on the acreage previously occupied by B.4098. The situation is made clear by a comparison of the per cent acreage figures for the 1957 and 1959 crops, as set out below:—

				1957	1959
B.4098	...	...	...	93.1	73.5
B.49119	...	...	...	0.4	16.6
B.4744	...	...	...	1.0	4.4

An even more indicative feature is that B.49119 accounts for more than 30% of the plant cane area to be reaped in 1959.

Barbados:

In the 1959 crop there are again large increases in the percentage acreages under B.4744, B.45151 and B.49119. B.41211 also shows an appreciable increase, and now emerges as the major variety of the island. Most of these increases have been at the expense of the old favourite B.37161, which, after sixteen years as the leading variety, now falls to second place.

Per cent acreages for 1959, together with those for the previous year, are set out below:—

				1958	1959
B.41211	...	...	...	20.18	24.03
B.37161	...	...	...	37.95	22.06
B.4744	...	...	...	15.69	20.16
B.45151	...	...	...	9.35	13.67
B.49119	...	...	...	5.94	11.15
B.4098	...	...	...	6.42	4.39

St. Kitts:

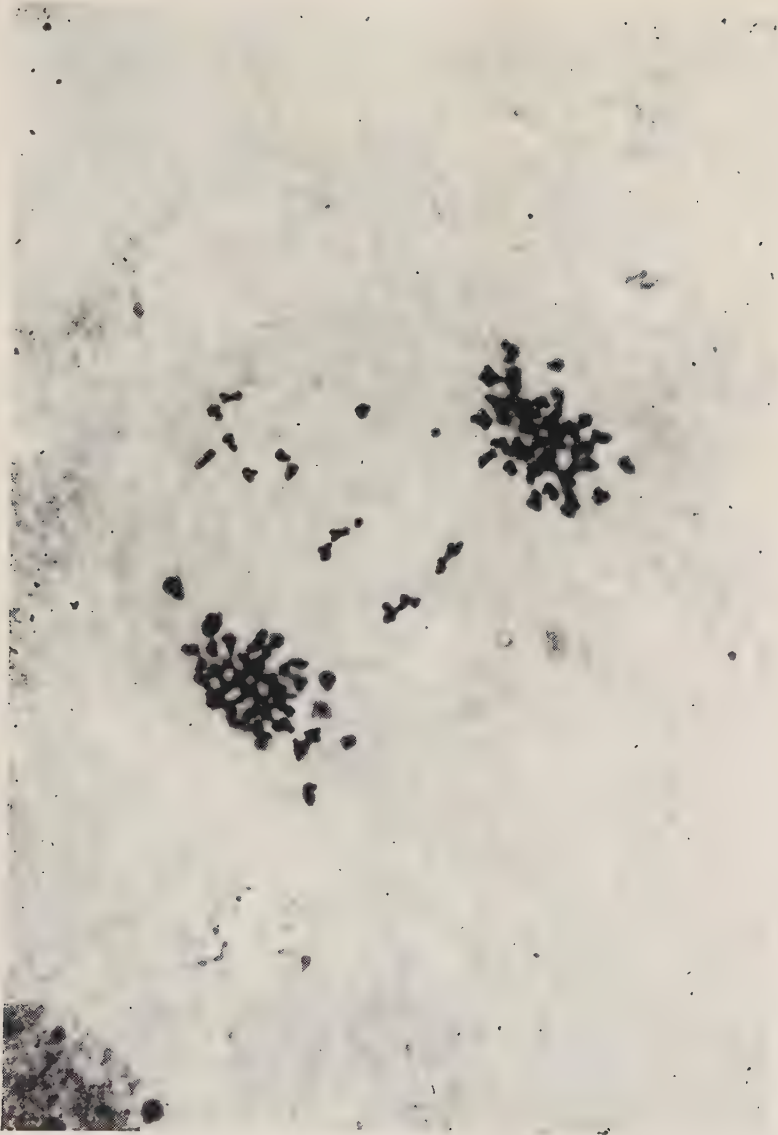
B.37161 has fallen from its former position as the leading variety in St. Kitts, and its place has been taken by B.41211, which accounts for the first time for more than 50% of the acreage for the 1959 crop. There has been increased planting, too, of the newer varieties B.45151, B.47419 and B.49119. Per cent acreage figures for the 1959 crop, together with those for 1957 to show the trend, are given below:—

				1957	1959
B.41211	...	...	...	38.3	51.4
B.37161	...	...	...	48.3	29.3
B.45151	...	...	...	—	8.1
B.49119	...	...	...	—	2.6
B.3337	...	...	...	2.2	2.3
B.47419	...	...	...	—	2.1
B.34104	...	...	...	3.3	1.6

St. Lucia:

Here dependence is placed mainly upon B.37172 and B.37161, and there are appreciable but smaller acreages of B.4362, B.H.10(12), and B.41227. B.34104, formerly a popular variety, is being replaced rapidly on account of its susceptibility to leaf scald disease, which was confirmed in the island in 1958. Per cent acreage figures for the 1959 crop are:—

B.37172	...	...	...	...	...	...	57.5
B.37161	...	...	...	...	...	...	26.1
B.4362	...	...	...	...	...	...	6.2
B.H.10(12)	...	...	...	...	...	...	4.5
B.41227	...	...	...	...	...	...	2.8



First anaphase in a pollen mother cell of B.37161, a male sterile variety. This cell shows some bivalents lagging at the equator, but in most cases restitution of nuclei appears normal and tetrads are formed. The pollen dies at a later stage of development. Aceto-carmin squash x 1000.



(TYPES OF BREEDING

The crossing lantern, designed by D'Albuquerque and Skeete some 30 years ago. These are awkward to erect and expensive to build, and their use will continue only so long as the present ones last.



LANTERN FOR FIELD USE)

Selfing lanterns of various designs, lighter and cheaper in construction. In the foreground is an experimental type with a wire netting framework, a plastic sheeting side to windward, and a drawstring round the skirt to minimise the risk of contamination by foreign pollen.



A stalk of B.41211, (in the hand) against a stool of D.253, a third generation inbred derived from B.41211, showing the similarity of appearance.

Distribution of Varieties to Contributing and Other Countries

In October 1957, selected consignments of the B.55' Series were sent to those contributing countries for which they were selected. The varieties and the countries to which they were sent are given below:—

Jamaica Ba.11569 and B.46103.

One cutting of each of the seedlings of the B.57' Series with the exception of B.5722 and B.5763.

In addition to the above, 'fuzz' of 124 crosses was sent to Jamaica.

British Guiana ... B.5503, B.5527, B.5557, B.5579, B.5599, B.55109, B.55111,
B.55132, B.55137, B.55244, B.55250, B.55258, B.55304, B.55309,
B.55317 and B.55362.

One cutting of each of the seedlings of the B.57' series with the exception of B.5722 and B.5763.

In addition to the above, 'fuzz' of 124 crosses was sent to British Guiana

**Antigua, St. Kitts and
Trinidad** B.5503, B.5527, B.5557, B.5579, B.5599, B.55109, B.55111,
B.55132, B.55137, B.55244, B.55250, B.55258, B.55304, B.55309,
B.55317 and B.55362.

In addition, cuttings of B.5463 and B.54262 were sent to Trinidad.

St. Lucia: B.52222, B.52298, B.52321, B.52371, B.53362 and B.54281.

Dominica: B.49119.

British Honduras: ... B.4744, B.47419, B.49119, B.50112 and B.52298.

**Guadeloupe and
Martinique** ... B.5503, B.5527, B.5557, B.5579, B.5599, B.55109, B.55111,
B.55132, B.55137, B.55244, B.55250, B.55258, B.55304, B.55309,
B.55317 and B.55362.

In addition, cuttings of B.5213 and B.5411 were sent to Guadeloupe.

Panama: B.52298, B.52321, B.52371, B.53200, B.53320, B.55244 and
B.55304.

Australia: B.47361 and B.49119.

Jordan: B.41227, B.4362 and B.45151.

Argentina: B.3337, B.37172, B.4098, B.4744, B.47258, B.47380 and B.47419.

**Plant Quarantine
Station — Trinidad** ... Co.419.

APPENDIX I.

SUGAR CANE BREEDING, SEEDLING RAISING AND FIELD NURSERY PLANTING 1957—58 — B.60' SERIES

Details of Crosses made, their Germinations, Numbers Potted and Numbers Planted in the Field Nursery.

CROSS	GROUP	No. Germinated	NO. PLANTED IN FIELD NURSERY	
			Singles	Bunches
Ba. 11569 x Comus ... Otaheite x Badila ...	<i>S. officinarum</i> Noble Noble	2,245 18	— 17	340 —
		2,263	17	340
	<i>S. officinarum x S. spontaneum</i>			
Tukuyu No.2 x B. 417 ... Ba. 11569 x B. 44131 ... B. 48361 x Ajax ... P.O.J. 3016 x B. 3337 ... B. 37172 x B. 3337 ... B. 3439 x B. H. 10(12) ... B. 35247 x B. 603 ... Ba. 11569 x Co. 432 ... P.O.J. 2878 x B. 52298 ... Co. 421 x Comus ... B. 5452 x B. 41211 ... B. 4145 x B. 5301 ... Trojan x P.O.J. 2878 ... Trojan x B. 41211 ... B. 3439 x B. 5301 ... B. 3439 x B. 53200 ... Otaheite x B. 39257 ... B. 52D. 22 x B. 54U. 141 ... B. 3439 x B. 54193 ... B. 3439 x B. 46364 ... B. 48165 x B. 603 ...	1st Nobilisation Tukuyu 2nd " Glagah 3rd " " 3rd " " 4th " " 4th " " 3rd " Celebes Noble x Local x Glagah " x " x " " x " x " " x " x " " x " x " " x " x " " x " x " " x " x " " x " x " " x " x " " x " x " Noble x Glagah x Celebes Noble x Local x Glagah x Celebes	31 6 — 860 662 7 69 70 818 288 130 27 112 1,950 6 475 — — 277 2,385 20	18 6 — — 421 7 68 69 720 275 120 25 104 — 3 — — — 267 — 18	— — — 171 43 — — — — — — — — 389 — 94 — — — 430 —
		8,193	2,121	1,127
B. 35207 x 28 NG. 13 ... B. 37161 x B. 3915 ... B. 37161 x B. H. 10(12) ...	<i>S. officinarum x S. barberi</i> 4th Nobilisation Chunnee 4th " " 4th " "	9 3 —	9 2 —	— — —
		12	11	—
B. 37226 x Ajax ... Ba. 11569 x B. 35269 ...	<i>S. officinarum x S. sinense</i> 2nd Nobilisation Sinense 2nd " "	— 10 10	— 7 7	— — —
	<i>S. officinarum x S. spontaneum x S. barberi</i>			
Co. 413 x B. 34104 ... B. 45225 x Q. 813 ... Trojan x Co. 281 ...	Noble x Local x Chunnee " x " x " " x " x "	3 1,305 27	3 — 27	— 226 —

APPENDIX I.—(Continued)

CROSS	GROUP	No. Germinated	No. PLANTED IN FIELD NURSERY	
			Singles	Bunches
Trojan x B.34104 ...	Noble x Local x Chunnee ...	124	100	—
R.333 x E.2412 ...	" x " x " ...	479	108	67
R.333 x T.11 ...	" x " x " ...	180	162	—
B.37161 x Q.28 ...	" x " x " ...	—	—	—
B.34102 x B.41227 ...	Noble x Glagah x Chunnee ...	165	136	—
B.35207 x P.O.J.2878 ...	" x " x " ...	335	330	—
B.4362 x B.51192 ...	" x " x " ...	118	115	—
B.37161 x B.55E.2412 ...	" x " x " ...	1,835	193	292
Q.813 x J.32 ...	" x " x " ...	1,211	96	200
J.12 x Q.813 ...	" x " x " ...	—	—	—
J.14 x Q.813 ...	" x " x " ...	1,213	115	215
J.31 x Q.813 ...	" x " x " ...	19	18	—
J.32 x Q.813 ...	" x " x " ...	730	122	115
J.34 x Q.813 ...	" x " x " ...	265	130	26
J.36 x Q.813 ...	" x " x " ...	39	39	—
J.1. x C.4153 ...	" x " x " ...	72	67	—
B.37161 x H.44—3098 ...	" x " x " ...	18	13	—
B.4547 x B.5401 ...	" x " x " ...	—	—	—
Co.421 x B.5411 ...	Noble x Local x Glagah x Chunnee	1,750	—	346
H.32-8560 x Co.281 ...	" x " x " ...	265	259	—
Co.413 x N.Co.310 ...	" x " x " ...	1,505	—	298
H.32-8560 x B.41211 ...	" x " x " ...	336	318	—
H.32-8560 x B.43234 ...	" x " x " ...	7	6	—
P.R.1000 x B.49119 ...	" x " x " ...	3,852	297	629
H.32-8560 x B.49119 ...	" x " x " ...	2,121	353	337
B.4362 x B.49119 ...	" x " x " ...	3,610	—	700
H.32-8560 x B.34104 ...	" x " x " ...	200	190	—
P.R.1000 x B.52298 ...	" x " x " ...	251	238	—
B.3353 x B.34104 ...	" x " x " ...	1,095	—	200
Pepe Cuca x B.41211 ...	" x " x " ...	72	66	—
B.5012 x B.34104 ...	" x " x " ...	89	86	—
Co.413 x B.4098 ...	" x " x " ...	1,090	—	218
B.52213 x B.41211 ...	" x " x " ...	—	—	—
B.37161 x B.4098 ...	" x " x " ...	2,045	—	398
B.40105 x B.41227 ...	" x " x " ...	662	530	—
B.45137 x B.4098 ...	" x " x " ...	11	11	—
B.4906 x B.4098 ...	" x " x " ...	3,080	—	546
B.4906 x B.41227 ...	" x " x " ...	1,975	—	400
B.37172 x Q.50 ...	" x " x " ...	100	83	—
B.37161 x Q.50 ...	" x " x " ...	959	87	161
P.R.1000 x B.4098 ...	" x " x " ...	3,185	—	600
P.R.1000 x B.37193 ...	" x " x " ...	304	262	—
B.4145 x B.49119 ...	" x " x " ...	1,194	359	160
D.62/43 x B.46136 ...	" x " x " ...	104	100	—
B.4373 x B.4744 ...	" x " x " ...	215	187	—
F.36-819 x B.41211 ...	" x " x " ...	1,330	373	168
B.5011 x B.47419 ...	" x " x " ...	4,475	—	730
B.5047 x B.4098 ...	" x " x " ...	930	—	176
B.51131 x B.4098 ...	" x " x " ...	591	290	54
Trojan x B.4098 ...	" x " x " ...	710	195	97
B.38233 x B.4744 ...	" x " x " ...	85	59	—
B.5012 x B.52298 ...	" x " x " ...	26	25	—
Trojan x C.P.29-116 ...	" x " x " ...	507	472	—
Trojan x B.5387 ...	" x " x " ...	10	7	—
P.R.1000 x B.47419 ...	" x " x " ...	864	238	120
B.48330 x B.49119 ...	" x " x " ...	471	443	—
Co.421 x B.4098 ...	" x " x " ...	314	286	—
B.4906 x B.4744 ...	" x " x " ...	675	—	135
B.4733 x B.47419 ...	" x " x " ...	810	—	160
B.4145 x Co.290 ...	" x " x " ...	418	360	—
B.3439 x B.34104 ...	" x " x " ...	1,545	—	290

APPENDIX I.—(Continued)

CROSS	GROUP	No. Germinated	NO. PLANTED IN FIELD NURSERY	
			Singles	Bunches
B. 3439 x B. 43235 ...	Noble x Local x Glagah x Chunnee	69	61	—
B. 51129 x B. 4098	" x " x " x "	161	136	—
M. 134/32 x B. 4098	" x " x " x "	1,133	91	181
B. 3439 x B. 49119 ...	" x " x " x "	1,118	180	174
B. 3439 x B. 51321 ...	" x " x " x "	109	107	—
B. 37172 x B. 4744 ...	" x " x " x "	—	—	—
B. 51311 x B. 4788 ...	" x " x " x "	645	256	68
B. 5401 x B. 4098 ...	" x " x " x "	190	160	—
B. 48209 x B. 49119 ...	" x " x " x "	266	230	—
B. 4362 x B. 4744 ...	" x " x " x "	14	13	—
B. 4214 x B. 4744 ...	" x " x " x "	81	75	—
B. 42279 x B. 49119 ...	" x " x " x "	465	—	94
B. 37161 x B. 54193 ...	" x " x " x "	1	1	—
B. 37161 x B. 47312 ...	" x " x " x "	62	60	—
B. 52D. 25 x B. 54U. 113	" x " x " x "	42	31	—
Co. 421 x B. 53R. 321	" x " x " x "	257	190	—
B. 50184 x B. 49119 ...	" x " x " x "	570	—	112
H. 32-8560 x N. Co. 310 ...	" x " x " x "	2,015	—	376
B. 37161 x N. Co. 310 ...	" x " x " x "	380	355	—
D. 22 x U. 141 ...	" x " x " x "	—	—	—
C. 4153 x J. 1 ...	" x " x " x "	—	—	—
E. 2412 x R. 333 ...	" x " x " x "	29	29	—
T. 11 x R. 333 ...	" x " x " x "	—	—	—
B. 37172 x H. 3 ...	" x " x " x "	668	475	—
B. 52321 x B. 4098 ...	" x " x " x "	9	9	—
D. 62/43 x B. 4098 ...	" x " x " x "	—	—	—
B. 51311 x B. 4098 ...	" x " x " x "	148	135	—
F. 38-819 x B. 34104 ...	" x " x " x "	357	320	—
B. 37172 x B. 49119 ...	" x " x " x "	301	217	—
B. 51311 x H. 44-3098	" x " x " x "	313	216	—
B. 3439 x B. 50347 ...	" x " x " x "	60	51	—
B. 51311 x B. 50347 ...	" x " x " x "	15	13	—
Trojan x B. 50347 ...	" x " x " x "	860	396	91
B. 5011 x B. 41227 ...	" x " x " x "	—	—	—
B. 5012 x C. 12 ...	" x " x " x "	117	113	—
Co. 213 x C. 12 ...	" x " x " x "	207	197	—
B. 5214 x B. 54193 ...	" x " x " x "	486	384	—
B. 52315 x B. 54193 ...	" x " x " x "	—	—	—
B. 48330 x B. 53227 ...	" x " x " x "	14	14	—
B. 51311 x B. 53227 ...	" x " x " x "	4	4	—
B. 43380 x Comus ...	Noble x Local x Celebes x Chunnee	2	2	—
Ba. 11569 x B. 47177 ...	Noble x Local x Celebes x Chunnee	855	—	137
B. 37172 x B. 47151 ...	Noble x Glagah x Celebes x Chunnee	11	11	—
B. 37161 x B. 47151 ...	Noble x Glagah x Celebes x Chunnee	2	2	—
B. 37161 x B. 50377 ...	Noble x Local x Glagah x Celebes x Chunnee	15	14	—
B. 43283 x B. 46136 ...	Noble x Local x Glagah x Celebes x Chunnee	1,370	—	175
B. 5082 x B. 4098 ...	Noble x Local x Glagah x Celebes x Chunnee	9	7	—
B. 4362 x B. 50377 ...	Noble x Local x Glagah x Celebes x Chunnee	680	—	128
H. 32-8560 x B. 50377 ...	Noble x Local x Glagah x Celebes x Chunnee	1,125	638	90
Co. 413 x B. 43337 ...	Noble x Local x Glagah x Celebes x Chunnee	—	—	—
B. 43295 x N. Co. 310 ...	Noble x Local x Glagah x Celebes x Chunnee	97	96	—
B. 43295 x Q. 50 ...	Noble x Local x Glagah x Celebes x Chunnee	14	11	—
B. 50370 x C. 12 ...	Noble x Local x Glagah x Celebes x Chunnee	149	136	—
		67,471	13,390	9,690

APPENDIX I.—(Continued)

CROSS		GROUP	No. Germi- nated	NO. PLANTED IN FIELD NURSERY	
				Singles	Bunches
		<i>S. officinarum</i> x <i>S. spontaneum</i> x <i>S. barberi</i> x <i>S. sinense</i>			
B. 5055	x B. 45151 ...	Noble x Local x Glagah x Chunnee x Sinense ...	1,945	—	383
B. 35207	x C. P. 38-34	Noble x Local x Glagah x Chunnee x Sinense ...	71	63	—
B. 45137	x B. 47258 ...	Noble x Local x Glagah x Chunnee x Sinense ...	278	272	—
B. 45119	x B. 47258 ...	Noble x Local x Glagah x Chunnee x Sinense ...	307	275	—
B. 45154	x B. 4744 ...	Noble x Local x Glagah x Chunnee x Sinense ...	1,035	—	204
P. R. 1000	x B. 45151 ...	Noble x Local x Glagah x Chunnee x Sinense ...	645	—	129
B. 44341	x B. 52107 ...	Noble x Local x Glagah x Chunnee x Sinense ...	68	66	—
B. 39254	x Q. 50 ...	Noble x Local x Glagah x Chunnee x Sinense ...	4	4	—
B. 39254	x B. 4744 ...	Noble x Local x Glagah x Chunnee x Sinense ...	185	170	—
B. 44341	x B. 45151 ...	Noble x Local x Glagah x Chunnee x Sinense ...	230	—	46
B. 3439	x B. 45151 ...	Noble x Local x Glagah x Chunnee x Sinense ...	4,055	—	800
B. 44111	x B. 49119 ...	Noble x Local x Glagah x Chunnee x Sinense ...	1,315	—	260
B. 45220	x B. 4744 ...	Noble x Local x Glagah x Chunnee x Sinense ...	262	197	—
B. 53355	x B. 49119 ...	Noble x Local x Glagah x Chunnee x Sinense ...	—	—	—
B. 45154	x B. 34104 ...	Noble x Local x Glagah x Chunnee x Sinense ...	441	423	—
B. 47399	x B. 54193 ...	Noble x Local x Glagah x Chunnee x Sinense ...	—	—	—
B. 45152	x B. 5401 ...	Noble x Local x Glagah x Chunnee x Sinense ...	1	1	—
Co. 413	x B. 45151 ...	Noble x Local x Chunnee x Sinense	1,745	5	337
B. 45152	x B. 34104 ...	" x " x " x "	7	7	—
B. 4145	x B. 45151 ...	" x " x " x "	967	95	167
Trojan	x B. 45151 ...	" x " x " x "	1,090	—	213
B. 39254	x B. 34104 ...	" x " x " x "	3	3	—
B. 37161	x B. 45151 ...	" x " x " x "	365	—	72
B. 37161	x B. 55B. 2224	Noble x Glagah x Chunnee x Sinense	1,635	520	215
			16,654	2,101	2,826
		<i>S. officinarum</i> x <i>S. spontaneum</i> x <i>S. sinense</i>			
B. 45220	x B. 4604 ...	Noble x Glagah x Sinense ...	453	208	27
B. 40272	x E. K. 28 ...	" x " x " x "	24	17	—
B. 40272	x B. 3915 ...	" x " x " x "	—	—	—
B. 47183	x Ajax ...	Noble x Celebes x Sinense ...	44	44	—
B. 39254	x B. 41211 ...	Noble x Local x Glagah x Sinense	615	—	123
B. 39254	x Pindar ...	Noble x Local x Glagah x Sinense	14	14	—
			1,150	283	150

APPENDIX I.—Continued

CROSS		GROUP	No. Germi- nated	NO. PLANTED IN FIELD NURSERY	
				Singles	Bunches
		<i>S. officinarum</i> x <i>S. spontaneum</i> x <i>S. barberi</i> x <i>S. robustum</i>			
B.49388	x B.49119	Noble x Local x Glagah x Chunnee x Robustum	952	900	—
B.4373	x H.37-1933	Noble x Local x Glagah x Chunnee x Robustum	—	—	—
B.4092	x 32M.Q.629	Noble x Local x Glagah x Chunnee x Robustum	1	—	—
B.5651	x B.4098	Noble x Local x Glagah x Chunnee x Robustum	—	—	—
B.5652	x B.4098	Noble x Local x Glagah x Chunnee x Robustum	89	87	—
B.45198	x C.12	Noble x Local x Glagah x Chunnee x Robustum	233	217	—
B.45107	x B.4098	Noble x Local x Glagah x Chunnee x Robustum	—	—	—
B.49170	x Ajax	Noble x Glagah x Chunnee x Robustum	215	164	—
B.4145	x H.37-1933	Noble x Glagah x Chunnee x Robustum	2,980	—	580
B.35207	x B.50G.3	Noble x Glagah x Chunnee x Robustum	73	62	—
B.47155	x B.49119	Noble x Local x Glagah x Chunnee x Robustum	1,053	537	48
			5,596	1,967	628
		<i>S. officinarum</i> x <i>S. spontaneum</i> x <i>S. robustum</i>			
B.3439	x B.51242	Noble x Glagah x Robustum	950	—	186
B.49281	x E.K.28	Noble x Glagah x Robustum	2	2	—
			952	2	186
		<i>S. officinarum</i> x <i>S. spontaneum</i> x <i>S. sinense</i> x <i>S. robustum</i>			
B.55B.4213	x B.53G.33	Noble x Glagah x Sinense x Robustum	73	68	—
		Selfs for Research Programme			
		<i>S. officinarum</i>			
B.50F.3	x Self	Noble	3	2	—
Badila	x Self	"	6	4	—
			9	6	—
		<i>S. officinarum</i> x <i>S. spontaneum</i>			
B.51E.23	x Self	3rd Nobilisation Glagah	37	32	—
B.55E.2411	x Self	3rd "	—	—	—
B.52D.22	x Self	Noble x Local x Glagah	35	31	—
			72	63	—
		<i>S. officinarum</i> x <i>S. barberi</i>			
B.54U.141	x Self	3rd Nobilisation Chunnee	3	3	—
B.37193	x Self	3rd " "	86	79	—
			89	82	—

APPENDIX 1.—*Concluded*

CROSS	GROUP	No. Germi- nated	No. PLANTED IN FIELD NURSERY	
			Singles	Bunches
<i>S. officinarum x S. spontaneum x S. barberi</i>				
53R.321 x Self ...	Noble x Local x Chunnee ...	2	1	—
Co.290 x Self ...	" x " x " ...	41	33	—
B.52J.1 x Self ...	Noble x Glagah x Chunnee ...	652	536	—
B.52J.3 x Self ...	" x " x " ...	74	53	—
B.52J.5 x Self ...	" x " x " ...	26	25	—
B.52J.4 x Self ...	" x " x " ...	117	94	—
B.55T.11 x Self ...	" x " x " ...	6	6	—
B.52T.2 x Self ...	" x " x " ...	16	14	—
B.55C.345 x Self ...	Noble x Local x Glagah x Chunnee	191	152	—
B.55C.33 x Self ...	Noble x Local x Glagah x Chunnee	—	—	—
B.54C.411 x Self ...	Noble x Local x Glagah x Chunnee	254	190	—
B.54C.413 x Self ...	Noble x Local x Glagah x Chunnee	49	42	—
B.55C.4133 x Self ...	Noble x Local x Glagah x Chunnee	21	18	—
B.55C.4153 x Self ...	Noble x Local x Glagah x Chunnee	24	22	—
B.49119 x Self ...	Noble x Local x Glagah x Chunnee	417	390	—
B.55C.4143 x Self ...	Noble x Local x Glagah x Chunnee	—	—	—
		1,890	1,576	—
<i>S. officinarum x S. spontaneum x S. sinense</i>				
B.53B.421 x Self ...	Noble x Glagah x Sinense ...	261	220	—
B.55B.2211 x Self ...	Noble x Glagah x Sinense ...	—	—	—
B.55B.2227 x Self ...	Noble x Glagah x Sinense ...	389	302	—
B.55B.1114 x Self ...	Noble x Glagah x Sinense ...	—	—	—
		650	522	—
GRAND TOTALS		105,084	22,216	14,947

APPENDIX II.

SUGAR CANE FIRST YEAR SEEDLING TRIAL — B.59' SERIES

List of Crosses and Number of Seedlings of each Planted in the Field Nursery
(May 1957) and in the First Year Seedling Trial (October 1957)

CROSS	GROUP	No. PLANTED IN FIELD NURSERY		No. Planted in First Year Seedling Trial
		Singles	Bunches	
Ba.11569 x Comus ...	<i>S. officinarum</i> Noble	555	—	91
B.34102 x P.O.J.2878	<i>S. officinarum</i> x <i>S. spontaneum</i> ...	79	—	6
B.3172 x B.41211 ...	3rd Glagah Nobilisation ...	158	—	22
B.37172 x B.41211 ...	Noble x Local x Glagah ...	158	—	62
B.4145 x Co.270 ...	" x " x " ...	15	—	7
B.35247 x B.46364 ...	Noble x Glagah x Celebes ...	646	274	91
		1,611	274	188
B.37161 x Co.270 ...	<i>S. officinarum</i> x <i>S. spontaneum</i> x <i>S. barberi</i> Noble x Local x Chunnee ...	50	—	9
B.37161 x Q.28 ...	" x " x " ...	9	—	6
B.46284 x B.43235 ...	" x " x " ...	96	—	9
B.3439 x B.37193 ...	Noble x Glagah x Chunnee ...	329	90	86
B.35207 x B.35267 ...	" x " x " ...	32	—	7
B.35207 x P.O.J.2878	" x " x " ...	316	109	142
B.37161 x B.3337 ...	" x " x " ...	90	—	4
B.37161 x B.4327 ...	" x " x " ...	50	—	6
B.37161 x B.4362 ...	" x " x " ...	100	—	33
B.37161 x P.O.J.2878	" x " x " ...	61	—	13
B.37172 x B.4362 ...	" x " x " ...	37	—	9
B.42304 x B.37193 ...	" x " x " ...	160	130	108
B.4362 x B.39220 ...	" x " x " ...	46	—	20
B.4362 x Cl.41223	" x " x " ...	170	45	55
B.49253 x B.41227 ...	" x " x " ...	328	—	70
M.134/32 x B.41227 ...	" x " x " ...	570	70	75
P.O.J.2878 x B.41227 ...	" x " x " ...	407	320	166
P.O.J.2878 x B.44279 ...	" x " x " ...	107	—	11
P.O.J.3016 x B.41227 ...	" x " x " ...	216	235	58
H.32-8560 x B.41227 ...	" x " x " ...	260	—	49
H.32-8560 x P.O.J.2878	" x " x " ...	380	139	188
Ba.11569 x B.53317 ...	Noble x Local x Glagah x Chunnee	28	—	5
B.3365 x B.49119 ...	" x " x " x " ...	420	309	125
B.35206 x N.Co.310	" x " x " x " ...	492	226	116
B.37161 x B.4098 ...	" x " x " x " ...	613	—	144
B.37161 x B.4409 ...	" x " x " x " ...	110	—	11
B.37161 x B.47419 ...	" x " x " x " ...	250	118	63
B.37161 x B.49119 ...	" x " x " x " ...	377	—	42
B.37161 x C.P.44-155	" x " x " x " ...	143	—	34
B.37161 x N.Co.330	" x " x " x " ...	10	—	—
B.37161 x Pindar ...	" x " x " x " ...	55	—	18
B.4145 x N.Co.310	" x " x " x " ...	9	—	6
B.4214 x B.3337 ...	" x " x " x " ...	468	302	71
B.4214 x B.4098 ...	" x " x " x " ...	630	232	116

APPENDIX II.—*Concluded*

CROSS	GROUP	NO. PLANTED IN FIELD NURSERY		No. Planted in First Year Seedling Trial
		Singles	Bunches	
B. 42279 x B. 41211 ...	Noble x Local x Glagah x Chunnee	345	—	43
B. 42304 x B. 49119 ...	“ x “ x “ x “	390	590	82
B. 4362 x B. 4098 ...	“ x “ x “ x “	280	119	117
B. 4362 x B. 43235 ...	“ x “ x “ x “	269	—	41
B. 4362 x B. 45236 ...	“ x “ x “ x “	207	232	187
B. 4362 x B. 52178 ...	“ x “ x “ x “	53	—	17
B. 4362 x Co. 281	“ x “ x “ x “	80	—	23
B. 4362 x Co. 419 ...	“ x “ x “ x “	328	381	50
B. 43358 x B. 51353 ...	“ x “ x “ x “	200	46	46
B. 45121 x B. 4362 ...	“ x “ x “ x “	49	—	16
B. 45137 x B. 34104 ...	“ x “ x “ x “	54	—	1
B. 45137 x B. 53362 ...	“ x “ x “ x “	318	184	60
B. 45170 x B. 41227 ...	“ x “ x “ x “	278	—	49
B. 45170 x B. 49119 ...	“ x “ x “ x “	200	—	15
B. 46284 x P.O.J. 2878	“ x “ x “ x “	19	—	4
B. 48106 x B. 4098 ...	“ x “ x “ x “	270	—	32
B. 48330 x B. 4098 ...	“ x “ x “ x “	172	—	69
B. 49282 x B. 34104 ...	“ x “ x “ x “	44	—	13
B. 49372 x B. 42231 ...	“ x “ x “ x “	217	—	65
B. 50151 x B. 41211 ...	“ x “ x “ x “	216	—	51
B. 5124 x B. 3337 ...	“ x “ x “ x “	88	—	18
B. 51311 x B. 4744 ...	“ x “ x “ x “	204	—	47
B. 51311 x B. 49119 ...	“ x “ x “ x “	390	—	61
B. 52242 x B. 4744 ...	“ x “ x “ x “	19	—	5
B. 5336 x B. 4098 ...	“ x “ x “ x “	28	—	3
Co. 360 x N. Co. 310	“ x “ x “ x “	248	42	40
Co. 413 x B. 41211 ...	“ x “ x “ x “	249	498	105
Co. 413 x B. 49119 ...	“ x “ x “ x “	255	—	11
Co. 421 x B. 4098 ...	“ x “ x “ x “	40	—	8
Co. 421 x B. 4995 ...	“ x “ x “ x “	289	251	141
Otaheite x B. 4098 ...	“ x “ x “ x “	120	—	19
M. 134/32 x B. 4744 ...	“ x “ x “ x “	50	—	16
P.O.J. 2878 x B. 34104 ...	“ x “ x “ x “	155	—	23
P.O.J. 3016 x B. 34104 ...	“ x “ x “ x “	50	—	13
Trojan x B. 4098 ...	“ x “ x “ x “	480	242	245
Ba. 11569 x B. 47177 ...	Noble x Local x Celebes x Chunnee	49	—	6
Ba. 11569 x B. 4968 ...	Noble x Local x Glagah x Celebes x Chunnee ...	18	—	—
B. 39157 x B. 4098 ...	Noble x Local x Glagah x Celebes x Chunnee ...	70	—	15
B. 39157 x B. 47419 ...	Noble x Local x Glagah x Celebes x Chunnee ...	140	—	14
B. 4362 x B. 49198 ...	Noble x Local x Glagah x Celebes x Chunnee ...	40	—	7
B. 43295 x B. 41227 ...	Noble x Local x Glagah x Celebes x Chunnee ...	94	—	7
B. 43349 x B. 47320 ...	Noble x Local x Glagah x Celebes x Chunnee ...	374	360	132
B. 52371 x B. 41227 ...	Noble x Local x Glagah x Celebes x Chunnee ...	380	—	58
B. 53165 x B. 4744 ...	Noble x Local x Glagah x Celebes x Chunnee ...	150	50	29
		15,386	5,320	3,879
	<i>S. officinarum</i> x <i>S. sinense</i> x <i>S. spontaneum</i>			
B. 45154 x B. 46364 ...	Noble x Glagah x Celebes x Sinense	229	651	104

APPENDIX II.—(Concluded)

CROSS		GROUP	NO. PLANTED IN FIELD NURSERY		No. Planted in First Year Seedling Trial
			Singles	Bunches	
		<i>S. officinarum</i> x <i>S. spontaneum</i> x <i>S. barberi</i> x <i>S. sinense</i>			
B. 3365	x B. 45151 ...	Noble x Local x Chunnee x Sinense	110	—	11
B. 39254	x B. 34104 ...	Noble x Local x Chunnee x Sinense	19	—	5
Ba. 11569	x C. P. 38-34	Noble x Local x Glagah x Chunnee x Sinense	44	—	9
B. 34102	x B. 45151 ...	Noble x Local x Glagah x Chunnee x Sinense	133	—	12
B. 35207	x B. 53218 ...	Noble x Local x Glagah x Chunnee x Sinense	300	210	155
B. 39254	x B. 49119 ...	Noble x Local x Glagah x Chunnee x Sinense	87	—	18
B. 39254	x N. Co. 310	Noble x Local x Glagah x Chunnee x Sinense	68	—	22
B. 44305	x B. 41227 ...	Noble x Local x Glagah x Chunnee x Sinense	113	—	38
B. 45152	x B. 5032 ...	Noble x Local x Glagah x Chunnee x Sinense	45	—	10
B. 45152	x B. 5301 ...	Noble x Local x Glagah x Chunnee x Sinense	16	—	7
B. 47399	x B. 49119 ...	Noble x Local x Glagah x Chunnee x Sinense	18	—	4
B. 5055	x B. 45151 ...	Noble x Local x Glagah x Chunnee x Sinense	125	—	30
B. 51244	x B. 45151 ...	Noble x Local x Glagah x Chunnee x Sinense	48	—	7
B. 39254	x B. 50377 ...	Noble x Local x Glagah x Celebes x Chunnee x Sinense	14	—	5
			1,140	210	333
		<i>S. officinarum</i> x <i>S. robustum</i>			
Ba. 11569	x C. P. 31-517	2nd Nobilisation Robustum ...	240	—	50
Ba. 11569	x 32 M. Q. 629	3rd " " ...	276	203	57
			516	203	107
		<i>S. officinarum</i> x <i>S. spontaneum</i> x <i>S. robustum</i>			
B. 4455	x B. 603 ...	Noble x Glagah x Robustum ...	150	—	33
B. 4457	x B. 417 ...	" x " x " " ...	150	—	38
B. 44233	x B. 603 ...	" x " x " " ...	232	47	62
			532	47	133
		<i>S. officinarum</i> x <i>S. spontaneum</i> x <i>S. barberi</i> x <i>S. robustum</i>			
B. 37161	x B. 51242 ...	Noble x Glagah x Chunnee x Robustum ...	160	—	30
B. 4587	x B. 4098 ...	Noble x Local x Glagah x Chunnee x Robustum ...	10	—	2
B. 4862	x B. 47419 ...	Noble x Local x Glagah x Chunnee x Robustum ...	90	—	23
B. 48357	x B. 34104 ...	Noble x Local x Glagah x Chunnee x Robustum ...	157	—	26
B. 35247	x H. 37-1933	Noble x Glagah x Celebes x Chunnee x Robustum ...	110	—	28
			527	—	109
		<i>S. officinarum</i> x <i>S. barberi</i> x <i>S. robustum</i>			
B. 45198	x B. 603 ...	Noble x Chunnee x Robustum ...	134	80	18
		GRAND TOTALS ...	20,630	6,785	4,962

APPENDIX III.

B.58' SERIES

DETAILS OF FINAL SELECTIONS FROM THE FIRST YEAR TRIAL

CROSS	GROUP	No. of Seedlings Reaped	No. Finally Selected (Breeding)	% Final Selection
<i>S. officinarum</i> x <i>S. spontaneum</i>				
P.O.J.2364 x B.603 ...	3rd Glagah Nobilisation ...	17	(1)	6
P.O.J.2364 x B.417 ...	3rd Glagah Nobilisation ...	29	(1)	3
B.3439 x B.3337 ...	3rd Glagah Nobilisation ...	55	2	4
Otaheite x B.52D.23	Noble x Local x Glagah ...	29	2	7
B.3439 x B.48392 ...	" x " x " ...	1	—	—
B.37172 x B.41211 ...	" x " x " ...	16	1	6
B.4145 x B.41211 ...	" x " x " ...	72	3	4
Co.421 x B.52D.21	" x " x " ...	97	4	4
B.4145 x B.39246 ...	Noble x Dacca x Glagah ...	7	1	14
		1,395	15	—
<i>S. officinarum</i> x <i>S. spontaneum</i> x <i>S. barberi</i>				
B.3439 x B.37193 ...	Noble x Glagah x Chunnee ...	370	13	4
B.3439 x B.4362 ...	" x " x " ...	3	1	33
B.35207 x P.O.J.2878	" x " x " ...	76	3	4
B.37161 x B.4362 ...	" x " x " ...	3	—	—
B.37161 x P.O.J.2878	" x " x " ...	7	—	—
B.37172 x B.41227 ...	" x " x " ...	8	1	13
B.37172 x B.46136 ...	" x " x " ...	7	1	14
B.4362 x P.O.J.2878	" x " x " ...	34	2	6
H.32-8560 x P.O.J.2878	" x " x " ...	50	—	—
M.134/32 x B.4362 ...	" x " x " ...	43	—	—
P.O.J.2878 x B.41227 ...	" x " x " ...	8	—	—
P.O.J.2878 x B.4362 ...	" x " x " ...	83	1	1
P.O.J.3016 x B.41211 ...	" x " x " ...	58	2	3
P.O.J.3016 x B.4362 ...	" x " x " ...	8	—	—
B.37161 x B.53E.241	" x " x " ...	26	2	8
B.37161 x Co.270 ...	Noble x Local x Chunnee ...	7	—	—
B.3365 x B.51321 ...	Noble x Local x Glagah x Chunnee	5	1	20
B.37161 x B.4098 ...	" x " x " x " ...	118	8	7
B.37161 x B.41211 ...	" x " x " x " ...	44	4	9
B.37161 x B.4744 ...	" x " x " x " ...	14	—	—
B.37161 x B.49396 ...	" x " x " x " ...	6	—	—
B.37161 x B.55134 ...	" x " x " x " ...	61	—	—
B.37161 x C.P.44-155	" x " x " x " ...	19	1	5
B.37161 x N.Co.310	" x " x " x " ...	76	3	4
B.38233 x B.4098 ...	" x " x " x " ...	38	3	8
B.4092 x B.41211 ...	" x " x " x " ...	81	2	2
B.4092 x B.4744 ...	" x " x " x " ...	7	—	—
B.4145 x B.4788 ...	" x " x " x " ...	63	5	8
B.42279 x B.3337 ...	" x " x " x " ...	95	7	7
B.42279 x B.4098 ...	" x " x " x " ...	64	4	6
B.4362 x B.4098 ...	" x " x " x " ...	46	3	7
B.4373 x B.4098 ...	" x " x " x " ...	47	3	6
B.4373 x B.42231 ...	" x " x " x " ...	85	2	2
B.48330 x Co.290 ...	" x " x " x " ...	71	2	3
B.4906 x B.4098 ...	" x " x " x " ...	356	13	4
B.49282 x B.34104 ...	" x " x " x " ...	5	—	—
B.5011 x B.42231 ...	" x " x " x " ...	4	—	—
B.5028 x P.O.J.2878	" x " x " x " ...	64	—	—

APPENDIX III.—Continued

CROSS		GROUP	No. of Seed- lings Reaped	No. Finally Selected (Breed- ing)	% Final Selec- tion
B. 5037	x B. 41211 ...	Noble x Local x Glagah x Chunnee	188	10	5
B. 5037	x B. 5121 ...	" x " x " x "	34	—	—
B. 50126	x B. 42231 ...	" x " x " x "	62	6	10
B. 50215	x B. 42231 ...	" x " x " x "	359	9	3
B. 50352	x P.O.J. 2878	" x " x " x "	30	2	7
B. 5142	x B. 4098 ...	" x " x " x "	136	7	5
B. 51131	x B. 4098 ...	" x " x " x "	43	1	2
B. 51167	x B. 4098 ...	" x " x " x "	18	—	—
B. 5214	x B. 4098 ...	" x " x " x "	97	5	5
B. 52184	x B. 4098 ...	" x " x " x "	20	1	5
B. 52242	x P.O.J. 2878	" x " x " x "	13	—	—
Co. 421	x B. 4098 ...	" x " x " x "	63	2	3
Co. 421	x N. Co. 330	" x " x " x "	53	1	2
F. 36-819	x B. 4098 ...	" x " x " x "	73	2	3
F. 36-819	x B. 4744 ...	" x " x " x "	82	—	—
H. 32-8560	x B. 34104 ...	" x " x " x "	20	1	5
H. 32-8560	x B. 4098 ...	" x " x " x "	131	5	4
M. 134/32	x B. 34104 ...	" x " x " x "	60	1	2
Pepe Cuca	x B. 4098 ...	" x " x " x "	13	—	—
P.O.J. 2878	x B. 34104 ...	" x " x " x "	131	5	4
P. R. 1000	x B. 34104 ...	" x " x " x "	73	4	5
Trojan	x B. 4098 ...	" x " x " x "	49	2	4
B. 35207	x B. 52D. 24	" x " x " x "	30	1	3
B. 37161	x B. 53C. 112	" x " x " x "	71	1	1
B. 52D. 21	x B. 52U. 12	" x " x " x "	175	6	3
B. 39207	x B. 53C. 414	" x " x " x "	3	—	—
Otaheite	x B. 53C. 415	" x " x " x "	1	—	—
B. 43349	x B. 47320 ...	Noble x Celebes x Glagah x Local x Chunnee ...	168	3	2
B. 5037	x B. 43346 ...	Noble Celebes x Glagah x Local x Chunnee ...	114	1	1
B. 50210	x B. 34104 ...	Noble x Celebes x Glagah x Local x Chunnee ...	91	6	7
Tukuyu No. 2	x B. 4098	Noble x Glagah x Local x Tukuyu x Chunnee ...	4	1	25
B. 4145	x B. 45109 ...	Noble x Glagah x Celebes x Chunnee	75	—	—
			4,645	170	—
<i>S. officinarum x S. sinense x S. barberi x S. spontaneum</i>					
Ba. 11569	x C. P. 38-34	Noble x Local x Glagah x Chunnee x Sinense ...	8	—	—
B. 39254	x B. 4408 ...	Noble x Local x Glagah x Chunnee x Sinense ...	2	—	—
B. 39254	x B. 4738 ...	Noble x Local x Glagah x Chunnee x Sinense ...	16	—	—
B. 39254	x B. 49119 ...	Noble x Local x Glagah x Chunnee x Sinense ...	81	7	9
B. 39254	x N. Co. 310	Noble x Local x Glagah x Chunnee x Sinense ...	50	4	8
B. 44341	x B. 41211 ...	Noble x Local x Glagah x Chunnee x Sinense ...	8	—	—
B. 44341	x H. 32-1063	Noble x Local x Glagah x Chunnee x Sinense ...	3	—	—
B. 47329	x B. 47419 ...	Noble x Local x Glagah x Chunnee x Sinense ...	20	—	—
B. 51259	x B. 4098 ...	Noble x Local x Glagah x Chunnee x Sinense ...	274	8	3

APPENDIX III.—*Concluded*

Cross	GROUP	No. of Seed- lings Reaped	No. Finally Selected (Breed- ing)	% Final Selec- tion
H. 32-8560 x B. 45151 ...	Noble x Local x Glagah x Chunnee x Sinense	299	8	3
M. 134/32 x B. 45151 ...	Noble x Local x Glagah x Chunnee x Sinense	59	2	4
B. 39254 x B. 34104 ...	Noble x Local x Chunnee x Sinense	18	—	—
		838	29	—
	<i>S. officinarum</i> x <i>S. barberi</i> x <i>S. sinense</i>			
B. 39254 x B. 37193 ...	Noble x Chunnee x Sinense ...	34	2	6
	<i>S. officinarum</i> x <i>S. spontaneum</i> x <i>S. sinense</i>			
B. 47183 x B. 603 ...	Noble x Celebes x Sinense	23	(2)	9
	<i>S. officinarum</i> x <i>S. spontaneum</i> <i>S. robustum</i>			
B. 47155 x B. 603 ...	Noble x Celebes x Robustum ...	15	(1)	7
	<i>S. officinarum</i> x <i>S. spontaneum</i> x <i>S. barberi</i> x <i>S. robustum</i>			
B. 4362 x H. 37-1933	Noble x Glagah x Chunnee x Robustum	102	5	5
B. 49388 x B. 47419 ...	Noble x Glagah x Chunnee x Robustum	137	3	2
		239	8	—
	<i>S. officinarum</i> x <i>S. spontaneum</i> <i>S. sinense</i> x <i>S. robustum</i>			
B. 48306 x B. 603 ...	Noble x Glagah x Sinense x Robustum	28	(2)	7
	<i>S. officinarum</i> x <i>S. spontaneum</i> x <i>S. barberi</i> x <i>S. sinense</i> x <i>S. robustum</i>			
B. 45152 x H. 37-1933	Noble x Glagah x Local x Chunnee x x Sinense x Robustum	36	2	6
	TOTALS	6,181	224 + (7)	3.7%

APPENDIX IV.
THIRD YEAR SEEDLING TRIALS — B.53' SERIES
Concluded in 1958

Average Performance of Plant Cane and First Ratoon Crops, 1957—58 Seasons

Plantation ...	Husbands	Alleyne* dale	Small Ridge	Valley	Portland	Bowman- ston
Soil Type (Turner)	IIa	IIb	IIb	IVb	IIC	IIc
Rainfall p.a. ...	ca. 60 ins.	ca. 66 ins.	ca. 53 ins	ca. 59 ins	ca. 63 ins	ca. 70 ins

VARIETY	(a) TONS CANE PER ACRE					
B.37161 Standard	35.17	33.24	36.00	33.81	38.33	38.78
B.41211 Standard	40.25	39.22	40.70	—	—	—
B.45151 Standard	—	—	—	37.52	47.79	50.62
B.4744 Standard	40.89	49.26	40.96	42.76	50.68	54.76
B.49119 Standard	47.87	45.10	42.70	45.17	52.32	57.40
B.5321 ...	36.15	32.86	30.40	30.78	35.81	41.04
B.5398 ...	32.12	32.13	26.99	36.14	33.52	33.08
B.53122 ...	35.55	31.05	27.37	32.74	35.92	37.25
B.53200 ...	41.62	32.91	32.50	45.49	37.13	39.68
B.53227 ...	38.45	37.71	30.35	33.07	41.31	33.15
B.53317 ...	43.17	36.28	39.53	30.96	42.67	34.23
B.53320 ...	39.48	34.44	31.38	30-31	37.80	40.22
B.53362 ...	36.12	33.67	36.45	38.70	40.75	43.41
SE per plot % GM	7.63%	9.12%	9.07%	8.41%	8.34%	10.33%
LSD (P = 0.05)	3.64 tons	3.87 tons	3.63 tons	3.56 tons	3.97 tons	5.04 tons

	(b) *PERCENT SUCROSE IN JUICE (PURITY)					
B.37161 Standard	16.5(87.7)	17.6(90.9)	18.8(91.4)	18.8(91.3)	17.5(90.0)	16.4(89.4)
B.41211 Standard	14.9(81.5)	16.6(89.3)	16.8(86.6)	—	—	—
B.45151 Standard	—	—	—	19.8(90.4)	18.7(89.5)	18.1(89.6)
B.4744 Standard	16.4(85.3)	17.9(88.2)	18.7(91.2)	18.5(88.2)	17.0(86.8)	17.3(87.3)
B.49119 Standard	17.6(86.8)	18.7(89.1)	19.3(91.4)	19.6(89.6)	17.8(87.6)	17.6(88.8)
B.5321 ...	16.9(86.1)	17.6(88.5)	17.6(88.9)	18.0(88.6)	17.5(86.5)	17.0(88.1)
B.5398 ...	16.2(84.4)	17.0(87.4)	17.9(89.5)	16.9(85.3)	16.4(84.2)	15.4(84.2)
B.53122 ...	17.0(84.6)	18.2(87.7)	19.0(90.8)	17.3(83.6)	17.0(85.0)	16.3(85.7)
B.53200 ...	16.2(82.0)	17.5(85.4)	18.9(90.7)	18.7(85.9)	17.3(85.0)	16.2(84.3)
B.53227 ...	16.1(85.1)	18.7(88.9)	19.4(90.9)	18.4(88.1)	16.6(84.8)	16.7(87.0)
B.53317 ...	16.6(86.5)	18.3(89.4)	18.6(89.4)	18.0(88.9)	17.9(88.9)	17.7(89.3)
B.53320 ...	17.0(84.8)	18.1(88.4)	18.3(88.7)	18.3(85.8)	17.3(85.7)	15.8(84.4)
B.53362 ...	15.8(82.7)	17.4(86.4)	17.6(88.3)	16.8(84.0)	15.6(81.9)	15.9(84.0)

	(c) *TONS SUGAR PER ACRE†					
B.37161 Standard	5.60	5.49	5.81	6.30	5.90	5.77
B.41211 Standard	5.44	5.99	6.44	—	—	—
B.45151 Standard	—	—	—	7.68	8.48	9.10
B.4744 Standard	7.48	8.44	7.31	7.63	7.54	8.50
B.49119 Standard	8.13	8.01	8.25	7.58	9.08	9.17
B.5321 ...	5.92	5.73	4.81	5.31	5.79	6.10
B.5398 ...	4.84	5.43	4.49	5.37	4.92	5.26
B.53122 ...	5.55	5.38	5.32	5.27	5.67	6.25
B.53200 ...	6.17	5.48	5.55	7.78	6.23	5.83
B.53227 ...	5.89	6.22	5.69	6.07	6.11	5.31
B.53317 ...	7.06	6.40	7.09	5.05	7.10	6.08
B.53320 ...	5.87	5.95	5.93	5.07	6.48	6.10
B.53362 ...	5.36	5.72	5.98	6.18	5.99	6.80
SE per plot % GM	12.7%	11.65%	10.75%	10.10%	8.16%	12.48%
LSD (P = 0.05)	1.71 tons	1.60 tons	1.43 tons	1.39 tons	1.19 tons	1.84 tons

* Data from two blocks only.

† Calculated from juice analyses by the Winter-Carp formula, taking no account of fibre content.

APPENDIX V.

THIRD YEAR TRIALS — B.52' SERIES

Concluded in 1958

Average Performance of Plant Cane, First and Second Ratoon Crops 1956—58 Seasons

Plantation	Hope	Searles	Neils	Boarded Hall	Apple-whaites	Guinea
Soil Type (Turner)	IIa	IIb	IIb	IVb	IIc	IIc
Rainfall p.a.	ca. 50 ins	ca. 60 ins.	ca. 65 ins.	ca. 60 ins.	ca. 85 ins.	ca. 75 ins.

VARIETY

(a) TONS CANE PER ACRE

B.37161 Standard	28.39	32.50	38.09	38.84	31.69	38.17
B.41211 Standard	36.46	36.18	43.42	—	—	—
B.41227 Standard	—	—	—	42.44	45.25	54.26
B.4744 Standard	33.99	40.90	50.21	43.15	42.91	47.33
B.5126 ...	33.60	27.59	43.14	34.30	44.93	49.23
B.5213 ...	39.46	39.33	47.43	43.41	35.96	44.86
B.5235 ...	35.84	35.79	39.80	38.65	41.31	39.89
B.52107 ...	36.39	38.44	46.63	43.98	40.56	47.37
B.52144 ...	35.93	36.58	46.29	45.70	34.29	47.95
B.52158 ...	32.49	34.72	39.08	37.20	40.33	45.10
B.52162 ...	30.21	36.96	43.72	41.00	41.16	49.28
B.52214 ...	36.44	45.19	50.92	43.32	41.82	52.07
B.52222 ...	31.23	37.95	46.43	38.44	41.26	52.17
B.52256 ...	33.55	36.29	41.99	37.04	43.00	43.08
B.52298 ...	35.58	41.78	52.05	45.45	43.15	54.65
B.52306 ...	36.46	43.51	51.92	43.20	46.96	52.55
B.52321 ...	33.02	40.21	47.41	42.23	43.71	42.55
B.52341 ...	32.44	37.74	42.17	41.02	37.43	44-24
B.52371 ...	30.69	31.06	41.38	33.58	41.80	42.18
SE pe plot % GM	7.77%	8.10%	6.79%	7.23%	8.46%	9.72%
LSD (P = 0.05)	3.02 tons	3.48 tons	3.50 tons	3.39 tons	4.00 tons	5.27 tons

(b) *PERCENT SUCROSE IN JUICE (PURITY)

B.37161 Standard	17.4(89.7)	16.8(89.5)	17.4(88.4)	17.4(89.9)	16.5(89.3)	17.4(89.2)
B.41211 Standard	15.6(83.5)	15.4(83.9)	16.4(83.7)	—	—	—
B.41227 Standard	—	—	—	17.8(88.1)	15.9(84.8)	18.4(87.6)
B.4744 Standard	17.4(88.4)	16.2(86.5)	17.2(85.8)	17.8(88.5)	17.9(89.7)	17.3(86.5)
B.5126 ...	18.6(88.1)	17.9(87.9)	18.7(86.8)	18.6(88.6)	18.1(88.3)	18.3(87.1)
B.5213 ...	16.3(87.1)	15.0(84.9)	16.7(85.8)	16.6(87.4)	15.6(85.9)	17.0(87.4)
B.5235 ...	17.5(88.3)	16.5(86.8)	18.0(89.0)	17.7(89.8)	16.7(89.0)	18.3(89.2)
B.52107 ...	17.0(88.7)	15.8(86.7)	16.6(85.7)	17.5(89.5)	16.7(88.9)	18.0(89.1)
B.52144 ...	16.8(86.5)	16.0(86.7)	17.3(87.2)	17.5(88.5)	16.6(87.4)	17.5(88.1)
B.52158 ...	17.3(88.1)	15.9(83.9)	16.9(84.4)	17.4(87.4)	16.2(85.9)	17.1(85.0)
B.52162 ...	16.1(85.7)	15.8(86.7)	17.0(87.3)	16.7(88.0)	16.4(88.0)	17.0(87.6)
B.52214 ...	17.1(86.4)	15.3(84.3)	16.3(84.9)	16.9(87.2)	14.5(82.9)	17.8(87.3)
B.52222 ...	16.4(86.0)	15.7(85.5)	16.3(83.7)	17.1(88.0)	16.5(86.7)	16.6(85.1)
B.52256 ...	15.2(84.0)	13.7(78.5)	15.0(79.3)	15.8(83.3)	15.0(82.4)	14.5(77.6)
B.52298 ...	16.3(83.6)	16.1(85.0)	15.7(79.0)	17.3(86.2)	17.2(86.3)	17.9(86.4)
B.52306 ...	15.2(85.5)	15.0(84.3)	16.1(85.2)	17.6(89.7)	16.4(85.4)	16.8(86.0)
B.52321 ...	18.1(89.8)	17.2(88.5)	17.4(85.8)	17.9(89.1)	18.4(90.1)	18.6(89.3)
B.52341 ...	15.9(87.4)	14.8(85.5)	16.6(87.0)	17.1(89.0)	16.8(89.4)	16.6(87.5)
B.52371 ...	18.3(86.2)	17.3(84.8)	17.8(82.8)	18.7(87.2)	15.9(85.0)	18.9(87.0)

* Data from two blocks only

APPENDIX V.

THIRD YEAR TRIALS — B.52' SERIES

Concluded in 1958

Average Performance of Plant Cane, First and Second Ratoon Crops 1956—58 Seasons

Plantation ...	Hope	Searles	Neils	Boarded Hall	Apple-whaites	Guinea
Soil Type (Turner)	IIa	IIb	IIb	IVb	IIc	IIc
Rainfall p.a. ...	ca. 50 ins	ca. 60 ins.	ca. 65 ins.	ca. 60 ins.	ca. 85 ins.	ca. 75 ins.

(c) *TONS SUGAR PER ACRE†

B.37161 Standard	5.05	5.31	6.80	6.30	5.83	6.32
B.41211 Standard	4.98	5.26	6.50	—	—	—
B.41227 Standard	—	—	—	7.35	6.35	9.36
B.4744 Standard	6.00	6.46	8.41	7.54	7.17	7.92
B.5126 ...	6.04	4.80	7.50	6.06	7.22	8.76
B.5213 ...	6.55	5.55	7.57	6.87	5.32	7.93
B.5235 ...	5.64	5.37	6.65	6.06	6.26	7.11
B.52107 ...	6.07	5.73	7.30	6.93	6.48	7.58
B.52144 ...	5.59	5.42	7.79	7.60	5.56	7.33
B.52158 ...	5.49	5.18	6.05	5.86	6.25	7.54
B.52162 ...	4.36	5.32	7.35	6.56	6.70	8.08
B.52214 ...	6.06	6.42	7.61	6.92	5.07	9.86
B.52222 ...	4.65	5.76	7.38	5.96	6.34	8.43
B.52256 ...	4.69	4.55	5.52	5.47	5.93	6.04
B.52298 ...	4.76	6.40	7.60	6.94	7.15	9.56
B.52306 ...	5.45	6.30	7.94	7.17	6.88	8.73
B.52321 ...	5.80	6.77	8.02	7.42	7.93	6.79
B.52341 ...	5.36	5.27	6.38	6.34	5.79	7.00
B.52371 ...	5.20	4.89	6.89	5.58	6.30	7.60
SE per plot % GM	8.64%	16.86%	7.93%	7.97%	9.11%	11.40%
LSD (P = 0.05)	0.99 tons	N.S.	1.20 tons	1.11 tons	1.22 tons	1.90 tons

* Data from two blocks only.

† Calculated from juice analyses by the Winter-Carp formula, taking no account of fibre content.

